JOURNAL

OF THE

Royal United Service Institution

PUBLISHED UNDER THE AUTHORITY OF THE COUNCIL.

Editor - Captain H. GARBETT, R.N. (Retired).

Vol. XLIII.—15th JUNE, 1899.—No. 256.

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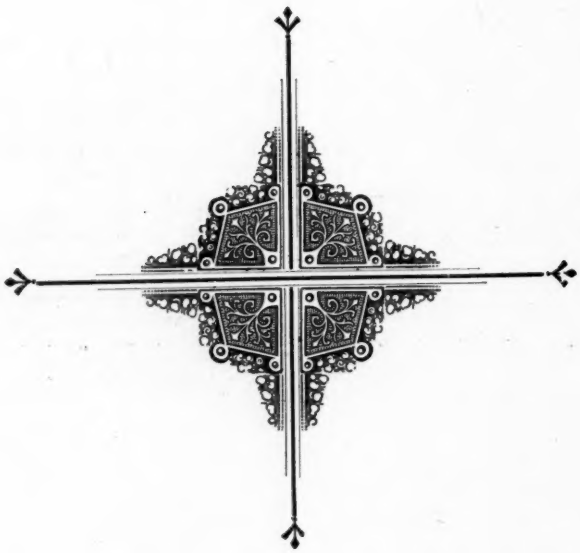

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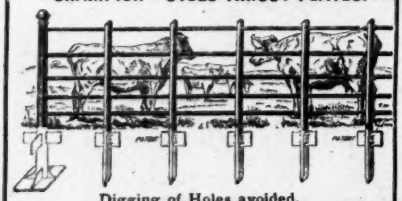

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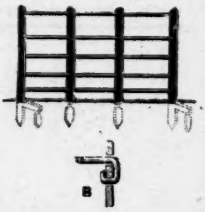

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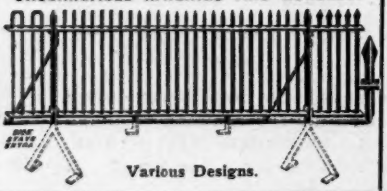

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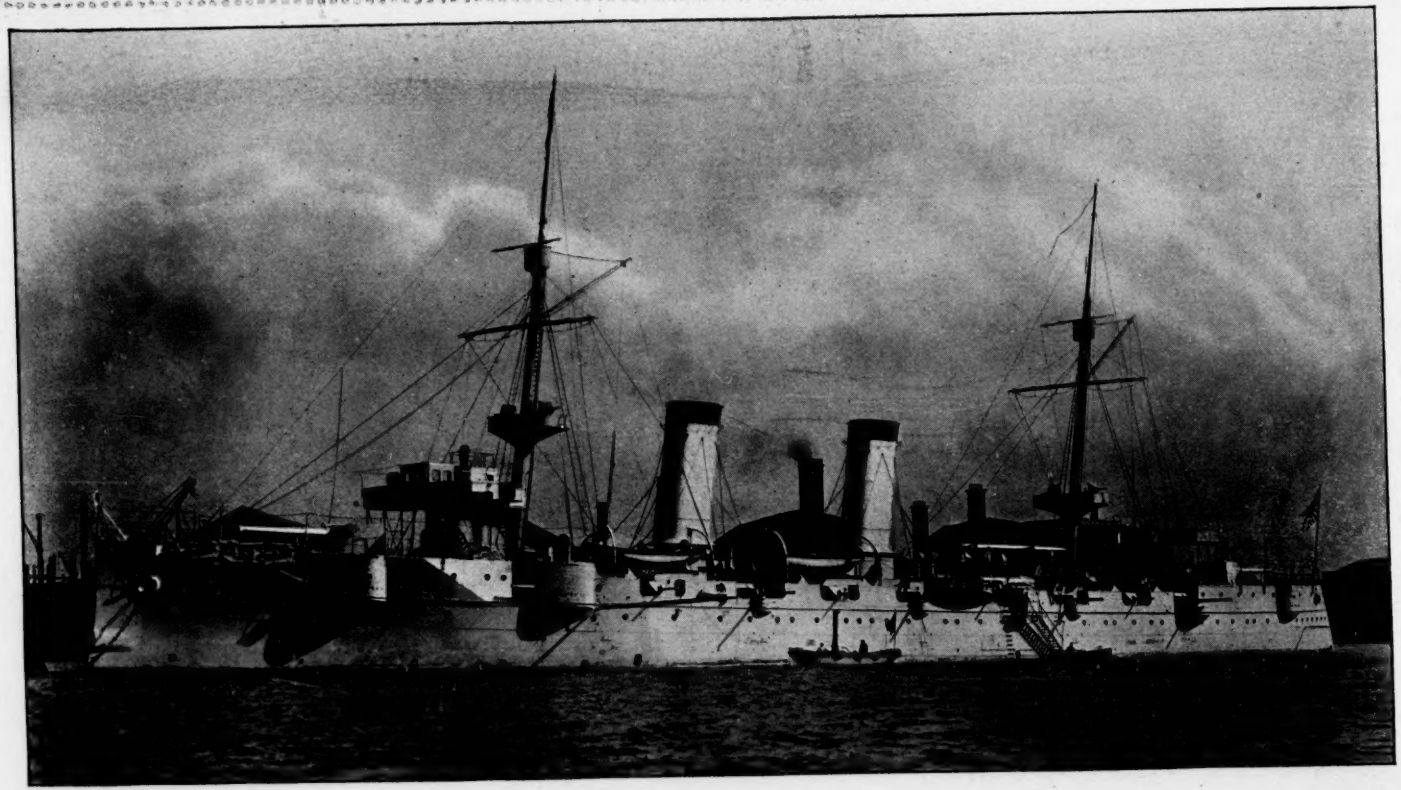

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THE JOURNAL
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GENERAL RECONNAISSANCES: THEIR OBJECTS AND VALUE, ETC.; TOGETHER WITH PERSONAL EXPERIENCES PUT FORWARD TO GUIDE THOSE ABOUT TO START ON THEM.

By Colonel MARK S. BELL, late R.E., V.C., C.B.,
Fellow King's College, London.

1. IT has been said, "That man succeeds in life who is best informed"; that that nation succeeds in war which has the best information is an axiom deduced from history, the truth of which cannot be gainsaid.

That a peaceful and commerce-loving nation, whose wide stretching and scattered territories are hemmed in by neighbours, ambitious and unscrupulous, ignorant and arrogant, savage and warlike, should in times of peace seek to gain a knowledge of their respective countries and resources in the interests of peace, progress, and commerce, may at first sight seem an endeavour irreconcilably inconsistent with its aim; yet its inconsistency vanishes, and its true purpose alone stands out in bold relief, when it is considered that the best criterion of peace is to know where and how to strike with effect, and how best to defend one's own; how to coerce and paralyse, as far as possible, with one blow, and to proportion the energy put forth to attain the object desired, so as to minimise the consequences of the disturbance of equilibrium which must arise, and by so doing to economise the force to be kept ready for its restoration; and when it is also borne in mind that the road of progress leads over the dead ashes of man's animal nature and of the pleasures of an untrammelled life, which those who enjoy will only give up by force and not by example.

Great Britain of all nations can least afford to neglect to make use of the strength to be derived from this knowledge of countries and peoples, she being a nation ruling an Empire encircling the globe and

one whose frontiers touch those of almost every nation and people of the earth, some of whom are as highly civilised as herself, others but emerging from the savage state of life, the majority representing every round in the ladder of progress lying between the above extremes.

Such an Empire is of necessity made up of a heterogeneous combination of territories and of the peoples inhabiting them, whom it is possible to incorporate into it to form one of its constituent classes: its lower or labouring class, its middle or trafficking class, and, to a certain degree, its military and upper or ruling classes.

To a nation ruling such an Empire the knowledge of its own constituent parts, and of the countries and peoples surrounding them, is an element of its strength and of its greatest power; indeed it is of the utmost national importance, when it is considered that they may become centres of revolt, theatres of war, or centres of commerce and of supply, both of *personnel and matériel*, for our own armies; considerations of moment, whether we consider ourselves as likely to be engaged as pacifiers, as enemies, or as allies. (See Concluding Remarks.)

Thus it is that surrounding and being surrounded by such varied elements, perhaps of prosperity, perhaps of strife and instability, friends or enemies of peace, commerce, progress, and civilisation, in the interests of humanity, it is essential that the rulers of our Empire should have a full knowledge of the countries within her borders and bordering her, a knowledge to be gained by reconnaissances of the scope and nature to be hereafter touched upon.

2. The main military objects of such reconnaissances are:—

a. The formation of correct judgments.

b. The acquirement of the knowledge of the forces to be overcome, and how to attain the end desired with the greatest economy of power.

3. It is an established fact that the results of war are never absolute. This is the natural consequence of the imperfect natures of its agents, viz., man and the animal creation that he calls to his aid. The great wear and tear of a campaign, its concomitant losses, sicknesses, anxieties, fatigues, etc., prevent the realisation of the ultimate aim of all war—the conquering the military force of a nation, *i.e.*, the country and the will of the people, and limit its object to the occupation of only so much territory, and the subjugation of his will only to the extent necessary to force him to yield the object for the attainment of which force was set in motion.

This knowledge of the force to be overcome and of the force necessary to overcome it, are to be arrived at by a perfect appreciation of circumstances that may be expected to arise, and by a comparative and just estimate of the moral and physical forces, the strategical talents and tactical organisations to be encountered, with reference to these forces, talents, and organisations as they exist in our own nation.

A knowledge of the above will enable plans to be elaborated and the resisting forces to be weighed and appraised at their proper value.

Thus only is it that correct judgments can be formed and the elements of chance to a great extent eliminated, and results predetermined with an amount of certainty unattainable by any other means.

The light also thus thrown upon the power of a neighbour to cope with our own preparedness is an essential requirement of strategy; deprived of it any step taken must be a step taken in the dark, full of danger perhaps, by chance only the right one.

The success therefore of a military venture will be the greater or less as its various steps are traced beforehand, and all available force simultaneously applied to its attainment; the more this force is compressed into one act, and the duration of its action into one moment of time, the better.

This economical application of power, the simultaneous application of a force sufficient to attain the end desired, is also to be deduced from the results of general reconnaissances, and is one of their main objects.

4. War has been aptly likened to a slow disturbance of equilibrium, a weary wearing away of force, the lasting powers of which can be nicely calculated when the conclusions drawn from former experiences are made use of. Given the living agents, all military operations hinge upon time and distance, factors largely influenced by a multitude of considerations, to be prepared to meet which beforehand is to be forearmed, to leave which to chance is to trust to a fatalism scornfully ironical and proverbially antagonistic to those who neglect to help themselves.

Some of the most important of these considerations influencing the course of a campaign from its inception, through its various stages, to its termination, will now be cursorily reviewed.

Tactics is the science of the use of military force in combat; a use greatly influenced by knowledge of the nature of the ground to be fought over.

Strategy is the theory of the use of combats for the objects of the war; to work out its problems intelligently an intimate acquaintance with the moral and physical forces of the armies operating within its theatre, as well as with the topographical features of the ground itself and the communications traversing it, is necessary. Its essence consists in the arrangement of separate marches in view to well-timed concentration and the occupation of important points, now more difficult to attain to than in former years, because the size of armies and the numerous roads which traverse cultivated countries often cause the strongest positions to lose their value.

The dispositions for the march, its precision, the extent to which its frictions can be lessened on the road by suitable camps, bivouacs, requisitioning (food, transport, etc.), cantoning, depôts to be formed, bases to be used, lines of communication to be adopted, season of the year to be chosen for operations, etc., etc., all essentials to conversation of power and therefore to success, are capable of being reviewed and reported upon.

The lines of communication are so sensitive that a wrong choice cannot be rectified and may cripple the campaign or render it wholly

abortive; whilst a strong, well-selected line will cause the enemy's movements to conform to your initiative. The best lines, even if the longest, will generally run through the most important provinces and the most flourishing towns. Main communications are most appropriately used for strategical purposes and not by-ways.

The large towns of a district give the greatest assistance to an army—shelter for troops, safe storage for provisions and war materials; their civil workshops, and tradesmen, etc., are of value; military establishments of many sorts are to be found in them; they are in fact essential to the organisation, administration, and maintenance of an army.

Military bases depend for their fitness upon sources of supply and refitment, fortresses to store munitions of war, open towns for storage of provisions, etc.

All ground influences the course of the battle, the preparation for it, the use to be made of it. It is an obstacle to view, or the reverse; it renders war complicated, diversified, and scientific; its influences are never in abeyance.

Uncivilised nations are incapable of possessing the highest military virtues; enthusiasm and fanaticism will in part supply their places. National armies, raised to meet an emergency, and insurgent levies are destitute of the virtues indispensable to a united body; guerillas fight best scattered, and choose a difficult and intersected country. Tribal levies, half-trained Oriental troops, and trained military bodies must be met differently. The more intelligence and a warlike spirit are wanting, the more an army will avoid difficult ground and dispersion and carry out a principle of concentration. A distinction is here made between the warlike and the military spirit. Tribal levies will possibly possess the former; trained bodies may possess both, or the warlike spirit may be wanting.

Ground regulates the relative proportions of the four arms; command of ground has in war a charm peculiar to itself; it gives command of view, a more easy application of force, a sense of superiority unwarranted by the truth.

The connection of ground with a defensive position is a double one—strategical and tactical. Strategical as regards its influence on the course of the campaign and defence of the country; tactical as multiplying force by adapting its defensive characteristics to the requirements of the several arms.

Mountain ranges and hilly country introduce into war a retarding principle on account of the difficulties of marching, transport, provisioning, etc.; they act as barriers, limit view and movements, shelter irregular troops, etc.

Rivers influence operations as barriers with certain points of passage only; they influence provisioning, lines of communication, etc. They require the assailant to act concentrated, and expose him to dangers.

Forests are of value both strategically and tactically. In rear of a defensive position, they enable the defender to see clearly and to develop his plans later than the assailant. They assist in giving cover and facilitate a retreat.

The above considerations will suffice to indicate to what a great extent the course of a campaign is influenced from its very conception and initiation, through its various phases, to its end, by the physical features of the country to be operated in, the position of its centres of supply, the direction of its main lines of communication, the character of its inhabitants, etc., etc. To enter on a campaign without having considered such influences would be for a commander to betray the high trust committed to him should the means and the instruments necessary to their consideration have been placed within his reach and he have neglected to employ them.

Although it is necessary that a commander should appreciate the true value of accidents of ground, yet the dangerous attraction of localities must at times be avoided, and the principles guiding the dispositions of troops must often ignore them; the plan of operations must seek primarily to conduct armies so as to ensure concentration, and to give them a fair field of action; the training of the troops must carry out the rest. These considerations, together with those given above, must be equally weighed in the balance. A just determination will be found to lie between the extremes of seeking to fight on ground well known, and refusing the combat on any other, and that of accepting battle on haphazard ground, *i.e.*, between the ideal of caution and full preparation to meet all emergencies, and that of a determined and resolute forward movement trusting alone to organisation, skill, and the first direction given to the heads of columns to work out a success. A commander should therefore ever bear in mind the value of the knowledge of country and people in the business of war, and lose no opportunity of turning its acquisition to his advantage by seeking to gain it by general and special reconnaissances.

General and Special Reconnaissances.

5. Reconnaissances may be classed as general and special; the former carried out in detail in time of peace, are intended to procure the most accurate information concerning countries that are likely to become theatres of war or centres of supply for our own armies, as well as concerning foreign armies and their war establishments.

It is to the consideration of general reconnaissances alone that this paper is limited. Special reconnaissances are treated of in all military manuals; not so general reconnaissances. Before the latter can be attempted an officer must be thoroughly trained in "special reconnaissances." (See para. 10.)

6. General reconnaissances therefore must consider our own as well as foreign countries. One of their primary objects is to procure the necessary *data*, in the first instance, for political and military study, and, secondly, for drawing up plans of operations, especially in so far as the first concentration and movements of an army are concerned. Inasmuch as the possession of a certain tract of country can never of itself act decisively, their scope becomes widened, and their attention turned to the living forces moving over the tract, which must always be of the greater importance.

The national character as well as the characters of the ruler and administrators for the time being are important points in determining the military value of a people.

In spite of taking and keeping the initiative, the means most conducive to enable a general to select his own fields of action and to obtain thereby all its concomitant advantages, he may be drawn by the operations of the enemy into positions and directions never foreseen, as well as into tracts of country, the peculiar topography of which may be unfavourable from more than one point of view.

That country is favourably adapted to the carrying on of military operations which is favourable to the movements, fighting, and subsistence of troops.

7. These main considerations influence the direction given to a general reconnaissance, and should be chiefly considered in drawing up its report; observations on the means of defence or lines of offence bearing in preference on the obstacles and military positions, etc., which lie along the principal lines of communications; those on which natural and general advantages are so combined as to form of themselves, or in conjunction with artificial obstacles, a good line of defensive or of offensive operations, being primarily considered.

A general opinion, giving a clear, general exposition of this nature, drawing special attention to the most important points, which may then be studied in detail, is to be preferred to a voluminous memoir considering every conceivable kind of position under every possible strategical combination. For purposes of perspicuity, therefore, reports should be drawn up in general and in detail. General reconnaissances must, consequently, be simple as regards their object, and thorough on the points concerning which information is desired.

These reports are sensibly facilitated by the number and quality of modern maps and works on geography, general history, inclusive of the newspaper history and records of the events of the day, military history, memoirs, regimental records, etc., etc., *i.e.*, by works of travel, history, and military literature generally. The sketches and reports of sportsmen and travellers are often of great value.

From these sources of knowledge the military information required has to be deduced and brought out in relief. In this respect tables of statistics are of great value, giving information concerning the population, head of cattle, cultivation, manufactures, etc., of a country, in a form at once practically useful. Reports made by Governments on the progress of public works, budget estimates, law reforms, commercial reports, etc., contain military information of a very valuable nature.

8. In systematically carrying out general reconnaissances, and, especially when examining countries likely, from political reasons, to become theatres of war, care should be taken primarily to acquire the information which may be wanting concerning the military geography and military statistics of the country in question, and to bring the information already acquired (especially maps) up to date.

Journeys undertaken for these purposes, the necessary preparatory special study and the reports made as the result of observation taken, are, moreover, the means of training officers entrusted with such like missions; the importance of this training should not be underrated.

9. In general reconnaissances the most accurate knowledge of the country to be reconnoitred that can be acquired beforehand from materials existing is, therefore, of essential value. We avoid thus losing time in acquiring what is already known. What is required is new information, or, at any rate, what is old brought up to date. The military history of a country is of great value towards giving hints as to the course of action to be pursued under varied circumstances. Many conditions of making war remain constant, and the truism that history repeats itself is not to be lightly disregarded.

10. The information gained by general reconnaissances requires to be supplemented by military reconnaissances of a special nature, the necessity of which will perhaps alone become apparent after the former has been carried out and its results studied. From them an opinion founded on observations actually made on the spot, and with a view to either the actual military situation at the time, or to a supposititious situation, is what is in most cases required, the facts and information on which the opinion is founded being given. Much of this special knowledge can be abstracted from general reconnaissances.

General reconnaissances approach to the character of special reconnaissances when carried out under some special supposition, such as, "offensive or defensive operations," "concentration of troops," "march of an army in a given direction with a definite object." Practically, this generally takes place after the plans of the first military operations to be undertaken have been decided upon and mobilisation is about to be ordered.

The information gained by special reconnaissances, drawn up by numerous individuals even though trained after various methods and to different degrees of excellence, trivial and unimportant though they may seem, yet, when systematically collated and combined, goes far towards the formation of a homogeneous whole, if each reconnoitrer has clearly and faithfully recorded what he has seen and heard whilst reconnoitring.

A methodical training in military academies in special reconnaissances is of more than ordinary importance. The words or map of a reconnoitrer must convey to the reader of them the impression intended. One man must not call, or represent, a mountain a hill, and another must not describe an undulating as a hilly country, a wood as a forest, or a dwarf tree as one giving timber. Climatic terms; hot, cold, etc., must not be loosely used.

11. The qualities of body and mind essential to a reconnoitrer are endurance, a good eye for country, an accurate judgment, and a quick perception—qualities possessed by most men to a greater or less degree; by all capable of being cultivated and widely developed by practice. These natural gifts, when properly trained, go far towards fitting the special reconnoitrer to carry out a general reconnaissance.

12. The first and foremost knowledge requisite for the carrying out effectually of a general reconnaissance is the most thorough general knowledge of the military sciences and details of military life, without which the conditions of the movements, fighting, and subsistence of troops cannot be thoroughly understood. By a trained observation, by study and practice, the reconnoitrer will be enabled to grasp instinctively the points on which, both as regards the people and the ground, it is desired to obtain information; its result is a sound military judgment.

13. As home defence is to a nation of first importance, the great part that the general reconnoitrer should be called upon to play when considering it will now be considered. The foregoing remarks on the value of general reconnaissances refer equally to home and to foreign countries; those that follow apply chiefly to the home country, colony, or dependency, and home defences, and will endeavour to indicate the value of such home reconnaissances and the objects to the attainment of which they may be most profitably directed, *i.e.*, to the defence of the country and the selection in times of peace of points to be fortified, communications to be improved and opened out, war establishments and mobilisation centres and supply depôts to be planned, etc.

Nations and peoples are often called upon to make large sacrifices to gain even a sense of security. The reality of true security to be gained by forethought at a comparatively infinitesimal cost is too often neglected, and a lavishly costly expedient, indifferently able to supply its place, adopted in the end; the old adage "Penny wise and pound foolish" does not hold in cases of national moment, for in addition to the pound sterling is the loss of prestige and self-respect, beyond the price that gold can pay for.

14. All warfare, whether in our own or foreign countries, must be preceded by preparation for it. This includes besides the organisation of armies and munitions of war, the preparation of the country itself for carrying on war advantageously by the construction or planning of the necessary buildings for the purpose—not only military establishments, but also communications and fortresses.

Improved means of locomotion, by rail, road, and water, serve continually to diversify strategical considerations. Numerous roads intersecting a country are in every way favourable to military operations, especially is a good longitudinal frontier communication essential to an economy of force and to its security.

Railroads are of higher importance than roads and river communications, in a military point of view, for certain periods of a campaign, and in certain directions, *i.e.*, for concentration, rapid movements from one theatre of operations to another, all movements from front to rear and *vice versâ*; the evacuation and provisioning of an army. Railway communication is rapid, continuous, and economical. Nearer the enemy, roads are of the greater importance.

Every new line of railway adds a fresh element of strength to a system of national defence, and with the efficiency of each separate line of railway the military strength of the country increases, for they serve to control

both time and distance, and commercial, industrial, and agricultural enterprise follow in their wake (para. 4). In their conception, therefore, a far-seeing policy must ignore a short-sighted economy. They are great civilising influences.

Railways thus exercise commercial, military, and political influences of the highest importance and are essential to the development of semi-civilised lands and peoples. Our Colonies have largely availed themselves of them to the increase of their strength and wealth. Had China run her railways to her frontier to meet those of Russia she would not now be in her present parlous state, and had India done the same westwards and northwards from Quetta and the Persian Gulf respectively she would have saved herself much anxiety. General reconnaissances should have brought out these wants in bold relief. (See Concluding Remarks.)

Improved communications also render necessary a change of political frontiers and a reconstruction of administrative limits; the establishment of our Empire in India and that of Russia in Central Asia exemplify these points. These necessary adaptations are, or ought to be, ever progressive. We are slow to acknowledge their necessity. Russia gives a notable example of a far-seeing administration, pushing pioneer-railways to gain future advantages; and India an equally notable one of their neglect, even when necessary to the development of outlying provinces. (See Concluding Remarks.) Russia has several times within the past few years re-arranged the Governments-General of Central Asia to meet the requirements of military bases of operations against Turkey and Persia, Afghanistan and India, and China. Their object is to have each base a distinct civil and military unit under one undivided control. Her re-arrangements are never in abeyance.

15. Fortresses, if well placed, must determine both the line of advance of an invader and the course of the defence of which they form the *points d'appui;* being immobile and bound to the spot where constructed, the selection of their sites becomes a matter of national importance and only to be reasonably decided upon when, and in so far as, one is in a position to determine how they will answer the purposes of war. The possibility of thus determining depends primarily on the permanent nature of the geography of countries; but cultivation, communications, resources of the neighbourhood, home politics and relations with other countries, and political boundaries must also be considered.

It is only on a foundation of so universal, geographical, and political a character that places can be decided to be worthy of fortifications—as being of importance in politics and in strategy, not for small objects, and not merely suited for the purposes of one war, but for those of all possible wars in the locality in question.

The importance of these places must also be supposed to be permanent, or to be of long duration.

16. The most secure basis for the choice of such points, to secure the best possible use of the ground fortified, rests on the geographical configuration of the country, for it regulates:—

a. The sites of the great centres of habitation, *i.e.*, cities.

b. The systems of communication between them.

Both are aids by which war must be carried on, and their possession is consequently essential.

The large towns of a district give the greatest assistance to an army (see para. 4); they are centres of provisioning, billeting, organisation, and of communications.

The home army must secure to itself intercommunication between such places by holding those points which are essential to free movements; such points, in the system of communications, are those the occupation of which would influence their use for considerable distances, *i.e.*, passes, defiles, etc. The most important of these are those which present the greatest natural obstacles, which are most difficult to turn, and towards which the greatest number of communications converge; such are generally found at important river crossings. These are also important as junctions of communications, as centres for concentration of troops, and for bases of operations; they enable armies to act in many different directions.

Hence to prevent the frittering away of the army, these essential points must be held by the minimum of troops. The means to this end is their secure occupation, *i.e.*, their fortification in time of peace, or at least the planning and laying out of the works, and the collections of the necessary material for their construction.

17. A general reconnaissance of the Punjab, on the principles already enumerated, is most desirable. It is one worthy of the close study and attention of the military student. Here the necessary preliminary study insisted upon as essential to the success of a general reconnaissance, would not only require that the reconnoitrer should traverse the length and breadth of the Punjab with all available topographical information in his possession, but that he, as well, should have thoroughly mastered several of Napoleon's campaigns in Europe, more especially that of 1814, exemplifying the bearings of rivers and river crossings on the strategy of a campaign.

The selection of the site for a bridge across a wide river is as much a question for the soldier as for the engineer. Such a site has a tactical and strategical value as well as a commercial one. The same remarks apply to the alignment of many lines of road and railway. Such considerations are best committed to soldiers, and all frontier communications should be under them.

Such localities are therefore to be chosen, as above suggested, with reference to the organising and maintaining of armies and navies, to serve as entrenched camps, war-harbours, arsenals, manufactories of war-material, war-dockyards; as magazines and depôts for safe storage of war-materials, etc.; as well as with reference to the movements of armies and navies, both to serve as barriers, and as means of securing a free passage in the presence of an enemy.

18. In all cases, view must be had to the possibility of conforming the ground to the uses of the home army, and to render it eminently unsuited to those of the enemy, *i.e.*, it must be chosen with reference to its object as an *enceinte de sûreté*, as well as on account of affording a favourable battle-field.

If the importance of the place, whether in any particular theatre of war or for the whole country, be so great that possibly the result of the campaign or of the whole war may depend on its possession, its importance causes it to be viewed with reference to its capability of becoming an entrenched position, where the struggle will be directed against the person of the enemy and the overthrowing of his army, the place itself being held as a means towards the attainment of the above ends. Antwerp is a good illustration of a place entrenched with the above object in view.

Such a selection of ground and the adaptation of works to it, by reason of the suitability of its natural features aided by art, and of its geographical situation, will prepare a battle-field in the highest degree favourable for the decisive battle of a campaign, to an army unable by reason of small numbers to take the field in unprepared positions.

19. A ground thus favourable is conceivable, without the kernel of a fortified place, somewhere in a part of the country where topographical peculiarities afford special tactical advantages, and where the locality is strategically suited for a decisive battle; but it will be generally found that these localities, because of their inherent advantages, have from early times been secured as fortified places, and hence it is that such favourable situations are generally found to have a fortified post as a kernel. This point may be illustrated by a reference to Kandahar; the mere fact of Kandahar being to-day a large town and of its having been such far back in historic times, points to its importance as a centre of commerce and communications; that it is also a fortified town, of a strength beyond that of other towns in the same neighbourhood, serves but to doubly certify to its military importance and to indicate it as also occupying a site of strategical importance considered relatively with the existing systems of communications. (See para. 14.) The same arguments apply to Kabul, Herat, etc.

20. It can never be possible to furnish the theatres of all possible wars with permanent fortifications, which will suit every requirement that may be expected to arise; the interests of civil life, considerations, technical and economical, prohibit this; want of time and money and political grounds may render it impossible even that such should be commenced.

Indeed, it will be impossible to force upon the consideration of the authorities, until emergency and the pressure of circumstances make their want stand out clearly, the importance of certain points. Hence arises the value of stable deductions to be drawn from a general view of the topography, history, etc., of a State, *i.e.*, the selection of such localities in time of peace, the recognition of their importance and the preparation of plans for seizing, holding, and provisioning them.

A well-conceived reconnaissance will not only draw attention to the keys of the country, as indicated above, but also to the numerous transformations of the existing condition of its theatre, by constructions and demolitions, which must take place in the closest possible connection with the military operations; and, by noting the previous preparation of

materials and workmen, etc., required, will enable the best uses to be made of whatever exists on the spot, and thus obviate waste of transport and time.

21. The considerations given will, it is hoped, serve to indicate the value of general reconnaissances, their wide scope, and the study, preparation and training required by an officer ambitious to carry one out. The opinions are chiefly those of the military writers of the day who have given their attention to the subject.

Let us now consider the actual field work necessary to their execution.

22. The training of an officer in reconnaissance duties received by him in the military schools and colleges, or what may be called the training of a special reconnoitrer, will be of the utmost use to him as a general reconnoitrer, if he has mastered their minutiæ and yet does not allow himself to be trammelled by them.

The *data* of the problem he has now to solve have changed, and it is his object to gain all the military, commercial, and topographical information he can with the greatest accuracy obtainable, and very possibly without drawing attention to his movements, and in the least possible time. The more skilled the reconnoitrer is in the use of compass, sextant, plane-table, theodolite, and level, the better will be the results of his rapid work.

Whilst driving, riding, or sailing, according to the circumstances of the case, selecting that mode of travelling most convenient to himself or dictated by the nature of the country to be traversed, accompanied, perhaps, by an escort or guide, he must at a glance be able to note features of ground, positions of strength, nature and methods of cultivation, distances, heights, slopes, etc., etc., *i.e.*, as many of the minutiæ required to be reported upon when carrying out special reconnaissances of country, communications, defiles, mountain districts, etc., etc., as possible. He must carry in his eye standard measurements of distance, height, slope, etc., and be able to judge them with accuracy and note them down quickly, perhaps without drawing rein, and always without attracting greater attention than that which must of necessity be drawn by every traveller out of his own country.

The topographical reports of a geologist are generally better and more instructive than those of others. There is a connection between the occupiers of a soil and its nature which determines their mode of life as settled agriculturists, as nomads, etc.

With a knowledge of the soil it can be predicted whether nomads can be settled as agriculturists, etc., etc. A knowledge of botany and of ornithology is useful, but less so than that of geology.

23. When the reconnoitrer takes up his headquarters in a town and can ride or walk and sketch or photograph round about its neighbourhood at leisure, his work becomes that of a special reconnoitrer, not touched on here.

24. Let us now assume the case in which it is necessary to draw up a military report on a province with a sea coast of from 100 to 200 miles

long, and an area of some 100,000 square miles, during the few months of cold weather, 3 or 4, during which it may be possible to be exposed to the sun during the whole day, that is, a reconnaissance such as an officer serving in India might be called upon to make in some Eastern country beyond Indian limits. Such a report must include:—

1. The coast line; its landing places, harbours, docks, dock-yards, etc., and all communications leading from them inland.
2. The chief communications of the country with the villages, towns and cities along them, illustrated by a route map, giving all the features of the country with an accuracy sufficient to meet military requirements. Traverses of the main arteries of communication which are also the main strategical routes will suffice. (See para. 26.)
3. A description of the forts, fortresses, arsenals, manufactories of warlike stores, etc.
4. An account of the military and naval forces.
5. An account of the mercantile marine and trade.
6. A general description of the country, its habitations and inhabitants, mode of living, clothing, habits, characteristics, etc., etc., food, climate, *i.e.*, details of all matters affecting military operations in the country being reconnoitred. (See para. 4.)

25. Before entering upon the field work of such a reconnaissance, the officer carrying it out will be supposed to have attended to the suggestions made in para. 7, and to have provided himself beforehand with all the aids necessary to its rapid execution. Reconnaissances made without preparatory study can only be useful as a means of verifying military considerations of high importance, or completing our existing stock of information on particular points.

He will be assumed to have then in his possession charts of the coast and the Admiralty directions descriptive of it and the offing; the best maps of the country procurable showing its towns, communications, mountains, rivers, etc., perhaps more or less imperfectly but still with an accuracy sufficient to direct his attention to points that it is necessary that he should visit, and giving the general directions in which he will have to travel. By previous reading he will have acquired a just idea of the climate he will experience, the character of the inhabitants of the country he is visiting, their mode of living, of travelling, money in use, etc., etc. He will then land with a dress suited to the country, and at once proceed to provide himself with an interpreter and means of travelling. He will know what is already known, and not waste valuable time in but retracing the footsteps of others, which he certainly will do unless the suggestions given have been attended to.

It is most essential that the reconnoitrer should keep his own counsel, and understand that his success depends upon his keeping his intentions secret, and in the display of the tact necessary to avoid

danger, whilst at the same time he carries out his intentions without attracting observation. He should confide in none and pass as a traveller: during his absence the less heard of him the better.

26. The nature of the field survey equipment required will be regulated by the following considerations :—

1. Travelling and route surveying must be carried out conjointly and at the quickest possible rate. This rate will be found to vary: when strong ponies are used, between 30 and 40 miles a day. Besides the endurance of the "mount" that of the transport employed and the distances apart at which travellers' rests are met with, or water and grass are obtainable, etc., regulate the daily journey. If travelling is carried on continuously for three months without change of transport the rate may not possibly exceed 30 miles a day with mule cart; 25 miles with pack mule; and 15 to 20 miles with camel or donkey carriage or bullock cart; if for six weeks only, at a stretch, a good pony will average 33 to 35 miles a day if a fast pace is not required of him, and carriage can be procured to keep up. So working, transport will be required to be fed on dry food.[1] A dry ration to be got in most countries is:—

Barley, beans, gram, Indian corn, or millet grains,
Bran,
Chopped straw,
Salt,

well moistened and thoroughly mixed.

A reconnaissance survey is most conveniently carried out on horseback, and less so driving or in any sort of conveyance carried by porters. In the latter case, should there be any difficulty in changing carriers, the above rate of progress will not be attained; if, too, the district traversed is mountainous, a deduction on this account will be necessary.

2. Surveying from horseback, all changes of direction will be most readily taken by a large-sized (2 inches in diameter) pocket compass, hung round the neck and fitting into a high breast pocket, lined with (chamois) leather. A prismatic compass, provided with a rapidly steadying dial, may be carried in the holsters for exceptional use. Carefully select both.

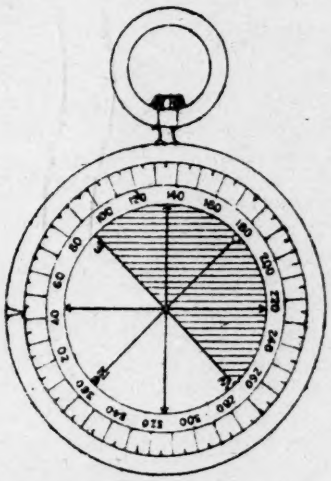
The compass used by the explorer should be of the watch pattern with the card swinging with the magnet, and graduated to 2° or 2½°. (See sketch.)

This compass is not too sensitive, can be used on horseback, and the angle is taken from the breast, *i.e.*, "glanced," by bringing the mark on the rim, which should be 90° from the handle and check spring, into line with the direction of the road, or object to which the angle is taken and not the eye—an enormous advantage when secrecy is required.

[1] In all daily about 8 to 10 lbs. of grain and 8 to 12 lbs. of chopped straw.

The prismatic compass, Hunter's pattern, with line across the glass let into the top cover, can be worked from the breast; it is too large for the pocket, but could be made to suit, no doubt. Colonel Verner's compasses are unsurpassed, and he could adapt one to meet any requirements.

Working honestly and diligently with such an instrument, distances being measured by time (the watch) and checked daily by enquiry and astronomical observations as hereafter described, results are obtained that those who have only been accustomed to more accurate and less rapid methods will not readily realise or perhaps acknowledge.



A reconnaissance of 800 miles in a circuit, executed as above, on horseback, at a walk, at the rate of 25 miles a day, has been carried out by the writer, the result on return to the starting point giving an error of "nil" in longitude and 10 miles in latitude, showing how relatively correct such a survey may be. It but required to be pentagraphed in between the intermediate and extreme points determined astronomically to become a correct geographical map. (See para. 28.)

Routes run in any direction without closing on the starting point, for thousands of miles, have been found equally relatively correct.

Plane-tabling gives excellent results when surveying can be carried out openly; therefore have one handy for use where possible; for triangulating and projecting points that may be useful in tying the route survey with the plane-table work, not forgetting when triangulating that a base guessed at between two prominent points can be accurately determined later on by measuring a smaller one on the level.

3. Distances can only be estimated by time; therefore at each change of direction, or whenever a bearing is taken, both time and pace must be noted.

Baggage animals and transport generally march at a very uniform pace; it is therefore best to work by both its pace and time. Noting halts and exceptional spurts or hindrances, the average pace is determined at the end of the stage and recorded.

27. The watch should be a silver half-chronometer, with a crystal glass face. A hunting watch, unless provided with a central cut to enable the watch to be read without the face being opened, should on no account be used.

The watch should wind up by means of a key.

The record of direction, time, nature of road, objects seen, cultivation, etc., to be at once noted in a pocket-book. The best size for this book is 5 inches by 8 to 8½ inches. Inside each cover should be a pocket for loose papers, and each cover should be provided with an elastic band and sheath for a pencil; when in use the elastic bands will prevent the leaves being agitated by the wind—a hard H H or H H H pencil is a convenient one for field use; the leaves should not be ruled. This book fits into an average-sized pocket or into holsters, and is of sufficient size to take in large tracts of country when used as a sketch-book. With practice the habit of writing whilst the horse is walking becomes easy, and it only becomes necessary to check him to take angles.

Commence by entering detail connected with the starting point: at every change of direction or of elevation, note time, bearing by compass barometric reading and topographical details, etc. So on, *seriatim* treat all points worthy of note, such as obstruction, soil, cultivation, brook, river, branch road, etc. Note bearings of remarkable objects. Care should be taken to note down all impressions on the spot. Frequently observe temperature. When halting determine the barometric daily wave by hourly observations, recording shade temperature.

Daily at the halt call together the old men, carters, or muleteers, from round about and interrogate them concerning roads to places of interest off the route traversed, and the surrounding country.

The reconnoitrer must devote his whole time and energy to the work and be continuously surveying as described, observing, interrogating, noting, etc.

When riding a restive horse it is necessary to work with a mounted orderly or servant. For greater secrecy it is best to work a few hundred yards behind the transport or escort if one is necessary.

Surveying as above by time, and direction, noting the horse's pace, or, far better, the pace of the baggage animals, which is more uniform, checking distances by numerous inquiries from villagers as to distances from known points, the starting point, the objective point of the day's journey, a route survey can be laid down giving all details affecting military movements, etc., with sufficient accuracy; but for geographical purposes something more than this is required. The reconnoitrer must be in a position to lay down his route on a geographical chart.

28. To enable this to be done he must bring astronomy to his aid; the heavenly bodies may, for the purposes of the traveller, be assumed by him to be so many fixed points to be, by simple means, transferred to his paper and used as checks to correct his daily route surveys, which for the sake of his own ease and for rapidity he has conducted as described. Every sailor finds his way across the trackless ocean by means of a few simple observations, and every soldier aspiring to be a general reconnoitrer must be able also, by simple altitudes of the sun or other heavenly body, to do the same on land. The word "astronomy" need frighten none; of its science the reconnoitrer need understand nothing; he has but to identify a star, by aid of a star chart which he should have in his possession, and to acquire the facility of taking its altitude and that of the sun, or the distances between the heavenly bodies—mere mechanical manipulations to be acquired by a little practice.

If time and secrecy admit, the traverse should be plotted daily. If the field-book is well kept, it can, at leisure, be placed in the hands of a draftsman to plot. The reconnoitrer should carry with him card-board scales 2 miles or 4 miles to the inch, for 2, 2¼, 2½, 2¾, 3, etc., miles an hour, divided into hours and minutes.

By pentagraphing down this field plot on 2 miles or 4 miles to the inch, to a scale of 8 miles or 16 miles to the inch, etc., the result will be an excellent geographical map. Care must, in the first instance, be taken to correctly fix the main points on the smaller scale geographical maps by latitude and longitude, the work on the "dead-reckoning map" being pentagraphed in by sections between these fixed points.

Good results would attend the selection of the six most accurate and rapid reconnoitrers who yearly pass out of the Staff College for further training in a reconnaissance of a position or tract of country, conducted in some such manner as suggested, by compass checked by simple astronomical observations, and necessitating a ride of 30 to 40 miles a day, working against time, and immediately submitting report and sketch on completion of the staff ride.

The astronomical equipment may be:—

One 6-inch Hadley's sextant.
One artificial horizon (Captain George's, R.N.).
Two silver half-chronometer watches and a good chronometer, if it be possible to carry the latter.

The only other instruments required will be a travelling thermometer or two, in metal tubes (ordinary, and maximum and minimum), two well-tried aneroids, and a boiling-point apparatus for determining heights:—

One 2-foot ivory folding ruler.
One nautical almanac.
One star chart.
One range finder; refer to Colonel Verner's works for explanation of their great value.

Mathematical instruments.
One telescope or binoculars of best description and power.
One level (eye).
One 100-foot tape.

A photographic camera, 8 inches by 6 inches (best maker), with dry plates, plate boxes, etc., will be very useful if they can be carried or left conveniently at certain points so as to be available when required; or latest improved Kodak.

All requirements necessary for skinning birds and animals and preserving their skins. A few lessons very desirable. Book for pressing plants.

Each man will also take with him the one or more books of reference that he prefers, but if he has learnt to understand the tables given in the nautical almanac before he starts, the fewer he takes the better. Raper's work is a valuable one and contains tables of logarithms.

The most convenient packing case for the instruments will be the portmanteau of spare clothes.

If a good patent portable log can be obtained for determining the rate of boats on rivers it should be taken, otherwise the boat's rate must be judged relatively to that of moving objects on the shore.

A lead-line, about 50 feet long, for soundings, provided with a lead sufficiently heavy to measure depths up to 30 feet and with alternate yards marked by red and blue tapes, should be carried in the holsters, as it is required whenever a river is crossed. When sailing, or when taking soundings of rivers with strong currents, a landsman will require practice in heaving the lead, and will find sounding to depths of 30 feet from a boat about as much as he can manage.

29. About personal equipment little need be said; each man has his own ideas upon this subject, and some are fond of luxuries and others are not; certainly, in the opinion of the writer, this is one of those times in life in which to be blessed with a superfluity of possessions is to be positively afflicted; to those who are of this opinion the following outfit may commend itself; in every case it must be borne in mind that the fatigue of travel and of continuous observation is very great, and that it is necessary to arrange everything so as to minimise it, and so to start a routine that thought need not be wasted on it:—

One valise, provided with cork mattress and pillow pocket sufficiently large to hold pillow, change of clothes, night clothes, slippers, etc.

[1] x.—Blankets to be folded and laid flat over the cork mattress.

The edges of valise to be provided with broad flaps pierced with eyelet-holes capable of taking stout whipcord, so that its bottom and sides may be laced together. In the evening it is but necessary to unroll the valise and unlace the flaps to get to bed, and in the morning, to smooth out the blankets, lace the sides together, and roll up the valise, which is, of course, itself waterproof and provided with stout leather straps. If the weather is very cold, to sleep with the sides of the valise loosely laced together gives great additional warmth.

One handbag, to carry all toilet requisites, towel, and odd requirements, such as hand-filter, penknife, boot-hook, corkscrew, matches, etc. During the midday halt this bag only need be opened. At the night halt

[1] To suit the climate.

too, very often, this alone need be unpacked, if the head-pillow of the valise has been well arranged.

One waterproof bag, provided with lock and key, to hold spare blankets, a suit of clothes, waterproofs, spare boots, leggings, one or two tins of food perhaps, and all odds and ends of requirements, *i.e.*, a sort of elastic reserve to hold the overflowings of other packages.

One portmanteau of spare clothes, to also carry the instruments, stationery, etc. Bear in mind that to most Orientals outside India, including the Chinese, short coats and tight-fitting breeches are indecent.

One box of provisions and a few medicines, with notes on their use drawn up by a surgeon, inclusive of three or four bottles of the best brandy, ointment for wounds and sore backs.

Saddlery.

Revolver, gun, rifle, ammunition.

One or more servants' boxes for pots and pans, small iron stove, and food daily required. Saddle-bags are most useful.

Waterproof sheeting. Presents to suit the country travelled in, and estimated to meet requirements.

The above alone is a formidable array of requirements, weighing, if the provision boxes are estimated at 200 lbs., 600 lbs. and upwards.

Keep boots and leatherwork well oiled; the army boot is an excellent one if previously prepared by being saturated with mutton fat; in wet and snow, smear over with mutton fat or oil. For very cold weather, sew blankets and furs into bags; poshteens are excellent. Carry insect-powder and put camphor into pillow-case.

30. As to stores, study the foods of the country and adapt them to use; but however good they may be, a reserve of flour with baking powder, or soda, is desirable for the Europeans of the party. In hot countries a reserve of rice, sugar, and lime-juice is necessary; biscuits, when to take the place of bread wholly for three or four months, should be obtained from a shipchandler's shop or Admiralty baker's at the last seaport at which procurable. Biscuits, rice, tinned butter and milk, if neither can be procured fresh, Bovril preparations, including soups, biscuits, lozenges, cocoa, etc., and Kopf's soups, tea, candles, and matches, will go far to meet all requirements. Flesh, fowl, eggs, vegetables, fruit, fresh or dried, must be sought locally.

All boxes should be packed, and loads bound up overnight; everything required to prepare the morning meal to be carried in saddle-bags, to be thrown over a load at the last moment.

The equipment enumerated meets all the requirements of necessity, and provides sufficient comfort with the expenditure of a minimum of fatigue to secure it; a sufficiency of luxury to preserve health without adding greatly to the amount of carriage required, for it may be assumed that as the latter increases, chances of accident and delays increase, and mobility decreases.

31. Repeating the assumption made in para. 25, the reconnoitrer will, whilst journeying to his starting-point, have met merchants, pilots,

ship-captains, hotel-keepers, and others connected with the land he is about to visit, and from each and all will have acquired information concerning the commerce, the people, the country, the harbours, and the thousand-and-one bits of practical knowledge possible to obtain from those alone who traffic with the people and live more or less amongst them. He will have learnt the prices of transport and riding-animals, rates of hire of carts, carriers, etc., and having landed, can at once complete his equipment for the journey, and provide himself with an interpreter.

In many cases a groom will be found to be the best interpreter, even if his knowledge of English is imperfect, for an interpreter should be ever at one's elbow, and this is the most natural place for the groom (if the reconnaissance is carried out on horseback).

At times to be without an interpreter is of great advantage, particularly so when reconnoitring forts or entrenched positions; the customs regulating such reconnaissances are given hereafter[1]; to ask questions concerning them is often simply to court a false answer; observations relative to them, and to landing-places, depths of water, rise of tides, etc., must be matters of personal observation, or they will be often worse than useless, because misleading.

A guide who accompanies the reconnoitrer or traveller from fort to fort, and observes that he endeavours to penetrate each, and that he goes through the same pantomimic expressions of surprise each time that he is denied admittance, and yet that each time he walks round about, peers into gateways and embrasures, and spends some time in the neighbourhood examining the country, the approaches and the commanding ground; and that so soon as he is at leisure perhaps he busies himself with note-book and pencil, becomes suspicious of his innocent intentions; whereas, supposing that he has trotted into the centre of a work without being stopped, if without a guide, the blusterings of the officials, in an unknown tongue, will be less provocative of harm than if he understood them; their revilings will not give him a moment's uneasiness, and whilst exhibiting surprise at finding himself an object of their wrath, he can display an utter indifference to proceed further, and yet not retire until he has carefully committed to memory many things worth noting.

32. Provided with interpreter and carriage, etc., a start can be made:—

1. At the point of departure itself, or at the nearest point to it have your chronometers rated.
2. Work out the latitude and longitude of the starting-point (or take the necessary observations to be explained hereafter[2]) and compare them with the known latitude and longitude; or, if not known, do this at the nearest place to it, the latitude and longitude of which are known.

[1] Pages 628, 629.

[2] Pages 630, 631.

3. At this latter place take the bearings of the sun at sunrise and sunset, and at the time of the observation for longitude and meridian altitude. From these observations the error of your compass and the magnetic deviation can be hereafter determined.
4. Equipped with compass and half-chronometer watch suspended round the neck, and fitting into neck and breast pockets lined with chamois leather; with aneroid, travelling thermometer, glasses, Abney's level, 2-foot rule, tape and lead-line in the holsters and pocket-book in coat pocket, there is nothing in one's appearance to attract attention, and no instruments are to be seen. Be careful to look after the holsters yourself.

One chronometer and aneroid must go with the luggage and be kept as standards of comparison. Work as already laid down in paras. 26, 27, for route sketching, taking the time of each halt and its duration, if not working by the time given by the baggage transport, noting each change of direction and the pace. All works on reconnaissance lay down averages at which men walk, horses walk, trot, and gallop; let the reconnoitrer avail himself of these, but, in addition, each man should practically test the rates of his progress under varying circumstances, and also the time of traversing a mile, and distances covered in an hour.

A day's journey will be found to be in most countries a well established distance and not to vary 10 per cent. day by day.

In addition to the route survey, surveys of the environs of all important places will be required, together with sketches at various points of the route, to exemplify the nature of the country traversed. These may be outline sketches only, and can be taken without dismounting.

With the portable instrumental equipment noted in para. 27, the astronomical observations to be taken may be—for Latitude:—

1. Meridian altitudes of the sun and stars.
2. The altitude of the Pole star off the meridian (north hemisphere).

For Longitude:—

1. The altitudes of the sun and stars taken for watch error (longitude), the former being taken about 8 or 9 a.m. and 3 or 4 p.m. Observe temperature (shade) and barometer.

Regularly observe the rule of getting morning and evening sights for chronometers and for latitude, observing as many altitudes of stars as may be considered necessary.

Work out before starting the approximate times that various stars will cross the meridian. (See page 631.)

It may not be possible, without much waste of time, to take the longitude of the place the latitude of which has been determined by the sun or stars; it will be sufficient in such cases, the intermediate distances traversed being short, to connect the two by the route survey (or dead reckoning) and bearings to distant remarkable objects, the bearings of which objects should be continuously observed as checks on the work.

Observe, when convenient, the times of the rising and setting of the sun and the direction of its centre by compass.

The centre of the sun is on the horizon when it appears its own diameter above it. Take also the direction of the sun's centre by the Azimuth-compass, at the time that a double altitude of the sun is taken; this observation, with a knowledge of the latitude and Greenwich mean time approximately, will enable the compass error to be determined, *V. U. S.*

Work up the note-book every night so that it shall be perfectly legible, add general observations on the day's journey; trust nothing to memory. A chronometer watch will measure short meridian distances and connect one place with another, so that all may be relatively right; the watch must be treated with great care. Compare the two chronometers nightly, and determine the watch error at every place the latitude and longitude of which are known, and finally at the end of the reconnaissance at the place the latitude and longitude of which were in the first instance determined. The error so worked out will give an idea of the accuracy of the whole work; it has probably been accumulative if the chronometers are good ones and have been treated with care, and can be distributed throughout the survey.

Have the chronometers rated on every available occasion.

33. When the reconnoitrer has mastered the rapid means of route surveying described and of checking his work by simple altitudes of the heavenly bodies, the interest of his subject will naturally lead him on to more difficult astronomical observations, giving proportionately more accurate results. Upon these it is unnecessary to touch here, as they would but complicate the method of carrying out a rapid military survey which it has been the object of this paper to show to be easy of attainment, to meet all military requirements, and many geographical ones without attracting undue attention; indeed, with secrecy. What is wanted is accuracy within itself, and this can be obtained by the methods indicated.

34. Equipped as described in para. 32, the reconnoitrer mounts his horse as if bent on a ride of pleasure; the use of a pocket compass on horseback, driving, etc., is not much noticed; it is held on a level with the chest and not to the eye; star observations, using the sextant and artificial horizon, can often be carried out in the early night.

These and sun observations will never attract much attention so long as it is explained to the onlookers and the curious that the sun is the clock by which you travel, and that as you journey your watch must be daily corrected; that you wish to ascertain the direction of Mecca, etc. To thoroughly impress this point it is as well to provide the interpreter with a watch to be kept daily at local time; you will at the worst be thought to be a pedant, and most suspicious of being led in a wrong direction; and you but do what every traveller should do in a country of which imperfect maps only exist, that is, prepare one for his own use and the advantage of others who may follow him.

Concluding Remarks.

The form that the report will take must necessarily vary; guides are given in all "Handbooks on Intelligence."

In drawing up his report the reconnoitrer must bear in mind that it should include not only his own observations, but as well references to those of others, and that it will be necessary for him to extract from the teachings of conventional geography all that is inseparable from the study of nations and peoples. This "Political Geography" should give all the information concerning ethnology, races, religions, geography, etc., that may be necessary, when read in connection with history, to enable the political or military reader to be prepared to meet all accidents, either political or military, and thus deprive accidents themselves of the character of emergencies.

If not already compiled, it is necessary that the report should treat of Government and Government officials, so that those who reconnoitre after him may start with his own full experiences.

The greatest value of a general reconnaissance will be attained if it enable a Government to further a policy of intuition and energy, and to act with foresight and continuity of purpose, and if, by a previous study of the conditions of the game that it may have to play in any country or field of enterprise, it ensures that it shall meet its adversary there at least on equal, if not with superior, chances of success. To illustrate my meaning, I give below extracts from recent writings on India and China; they might be multiplied *ad infinitum*, but they will suffice to show the value of general reconnaissances, for it would have been the duty of the reconnoitrer to have reported on the points so prominently brought to notice therein, and not only to have drawn attention to their importance, but also to their relative importance with reference the one to the other.

A correspondent thus writes to the *Morning Post* regarding "The Need for Action in India":—

"I have been struck by the evils that result to nations from the procrastination of their rulers and their neglect to avail themselves of information at their command or to give to it its proper relative value. The immediate evil to which I would refer results from India's neglect of Baluchistan, a valuable outlying province which she leaves in a state of uncivilisation and stagnation so reprehensible that the Goddess of Progress is now avenging herself on her for this sin of omission. Years ago Baluchistan was ripe for improvement, for the construction of a pioneer railway from Quetta—dipping southward and westward to Seistan to tap the trade to Central Asia and with a connection with the Persian Gulf—and for canalisation by utilising the waters of the historic Helmund, a river once bordered by cultivation studded with numerous cities. India's action as regards Baluchistan has been unstatesmanlike, petty, and parochial, and had Russia been her mistress these works and more besides would have been carried out. Under the guidance of a master-mind new-born Africa is outstripping India in progress, and even the

Soudan has its railway, and if India does not know how to lay a cheap line of a like nature let her requisition a batch of Lord Kitchener's officers to do the work for her. Had these works been initiated a decade ago India would not now be envious of Russia's civilising action, and of her determination to do what she has neglected, and will do for her unless India does it at once. We should copy Russia's policy of constructing pioneer railways in Asia, and run our rails to meet hers, so that civilisation may be advanced and commerce be unimpeded, and we continue to hold our due share of it."

The committee of the Shanghai branch of the China Association, writing in January last on the present condition of foreign trade with China, attributes "The hitherto neglect of the China question by our Government, and the policy of drift into which we have fallen, to a mistaken estimate of the strength of British prestige in the Far East, coupled with a fallacious belief in the power of China herself; the nations, newer in the field and comparatively unhampered by traditions of the past, have seemingly been better able to interpret events in the light of common experience, and have found opportunity in our complaisance and inactivity to exploit the situation to our disadvantage"; and again they point out that it is "A great error to proceed on the assumption that the few high officials who, with the Court, may be said to constitute the central Government, are desirous of seeing China strong, or of maintaining the integrity of the Empire. The people wish it, but public opinion can scarcely make itself heard, much less can it be proclaimed in a way that will influence the Government," etc.; and again: "It may be fairly claimed that the British Government has received, from its Ministers, Consuls, and Merchants, a sufficiency of facts, opinions, and suggestions from which a definite and resolute policy might long ago have been deduced. The future of our relations with China may safely be gauged by the experience of our relations with China in the past; nothing has ever been gained from China except through pressure, backed by force, and nothing will ever be gained from her except by the same means."

That general reconnaissances of countries bordering our Empire and through which our Imperial communications must eventually run, *i.e.*, of China, Siam, Persia, Turkey in Asia, Afghanistan, etc., should be thorough and up-to-date is of the greatest national importance, and that they should be studied when made, of no less importance; for it will always fall to the lot of men who sit in official arm-chairs to decide on the action to be taken; and this is as it must be; for it is possible that the reconnoitrer may have been influenced by his surroundings; the fatigues, discomforts, and dangers incidental to his work, and his reports tinged by enthusiasm or despondency, or what may be termed his "personal error," according as his temperament is sanguine or the reverse; and moreover the home official alone has full knowledge of the bearings of other questions upon the one specially reported upon.

In writing a paper on a subject of such wide extent as the one treated, it was the intention of the writer to confine himself to its main lines, and in no way to tread the by-paths of special considerations.

For notes on details, see "Reconnaissance Hand-books." To make the paper more complete a few details are touched upon in the Appendix.

After reading the works of a traveller, and marvelling at the excellent maps he has produced, one naturally asks oneself, "How did he do it?" The foregoing remarks, it is hoped, will explain how it might have been done. The methods advocated have been practically tried over an extensive area and found to give good results, far better than many will anticipate.

Also one marvels at the prescience of a general who has foreseen difficulties, avoided dangers, and anticipated the very battle-fields on which campaigns have been decided and the fate of nations determined, and one again questions how it was done; and again it is hoped that the preliminary remarks of this paper on general reconnaissances will answer the question. To do it, however, it is necessary to use the proper agents, *i.e.*, a body of officers trained to a certain standard and working to one end. This training the Staff College course endeavours in a uniform manner to supply, and to men so trained and to others who, by character and tastes, are fitted to carry out general reconnaissances, those responsible for the conduct of affairs turn for aid—at least, they do so if well advised. Those will cavil at this statement who decry all uniformity of training as a bar to genius and a drag on originality; let the adage of the strength of the bundle of sticks be borne in mind, and be sure that genius and originality, whilst drawing advantage from training, will also learn from it when to throw off its trammels and break through its bonds should circumstances arise rendering it necessary and advisable to do so; for genius was never stayed by rein or curbed by bit, and the members of the bundle—symbolising a body of uniformly trained staff officers—are doubtless content to form part of it and to be handled by one understanding its strength. It was not genius and originality that enabled Germany to overcome France, but system, gained by training and welded by discretion.

It may be argued also that England has never worked thus and has never troubled herself about information and reconnaissances, and yet that she is to-day a great Empire encircling all nations. To this it may be answered that she has always, unconsciously to herself, so worked. The officers of her Navy and mercantile marine, her merchants, pioneers of commerce, her adventurers, have always been the best of intelligencers and appreciators of the nation's wants. She may be said to be a nation upon whom the enterprising spirits of her sons have forced greatness.

It behoves Great Britain to beware how she lays down the *rôle* she has thus been elected to play in the world's history, and how she allows herself to get out of touch with her environments; to lose touch with them, to stagnate, will be as surely to die as have died the nations that educated the world before her.

But times have changed, and the tide of opinion has ebbed, and free spirits must seek other outlets and suffer themselves to be curbed by an organised system which can now alone take the place of that self-organised, and so carry on the work so ably performed heretofore by the

nation's often wayward, generally irresponsible, yet nevertheless boldest and truest sons.

One may praise the dead without causing a blush to suffuse his cheek, and the late Major-General Sir C. MacGregor was one of Britain's most prescient reconnoitrers. The late lamented Captain Gill was also one of the most enterprising and noble of these: enterprising because, despising the luxury at his command, he voluntarily elected to encounter dangers, difficulties, and fatigues; noble, because he staked all for a reputation to be gained only at enormous risks. Losing his life, he gained the reputation he desired—and that a true and not a bubble one—perhaps impossible to have gained at a less risk or cost.

The reconnaissances of the Russian Colonel Prjevalski are instances of the value of the explorations of one man, should he be a trained observer. No one who has read his works can doubt of their military, in contradistinction to their scientific, value, which is patent to all. The opinions of such an officer are perhaps of more value than that of a *whole commission*, because formed by one trained intelligence cognisant of all details. In one person we find here combined the soldier, sportsman, botanist, ornithologist, geographer, and exploring surveyor. Let others endeavour to tread in his footsteps.

Russia, by utilising the information recorded by him concerning China, has already reaped incalculable advantages over other nations, Great Britain included, who have neglected it.

The results of the expedition about to explore the sources of the Yellow River, under the guidance of Russian military officers, cannot but be productive of important results; for Kashgaria borders on Turkistan, and is only separated from it by the Gobi Desert, in places not the impassable obstacle it is supposed to be. The population of both is Mahammadan, ready to overflow from their overcrowded oases into Kansuh, whose Mahammadan peoples have already proved to be a sword in the heart of Central China, to the Chinese Government. *Verb. sap.*

APPENDIX.

AMPLIFICATIONS.

Para. 24.

1. In carrying out the reconnaissance of a coast line, an Admiralty chart is required to indicate the nature of the offing and depths. The land reconnoitrer must walk or ride along its edge.

2. Before a valuable report can be drawn up on an arsenal, dockyard, powder manufactory, etc., several institutions of a like nature should have been visited and their machinery, process of manufacture, etc., studied. Torpedo works and schools of electricity, etc., now form integral parts of the war establishments of even fifth-rate Eastern Powers, and such-like matters must be generally understood.

Para. 31.

1. In conducting a reconnaissance of foreign armies, navies, and fortresses, when specially deputed and officially accredited, the greatest

tact and strictest discretion are necessary. Any attempt to procure information secretly and on forbidden grounds, which cannot be obtained in the everyday intercourse permitted with the troops, would be unjustifiable and compromising. Official introduction and consequent courtesy received compel the reconnaissance officer to restrict himself in his reports to what has been voluntarily placed within his reach. Should there be reason to suppose that the latter does not meet the ends desired, freedom of action can only be resorted to on the conditions of having no further reference to and taking no further advantage of the support or assistance of the authorities of the country in which he intends to travel and gather information.

Even in the latter case he is not quite free and unfettered. To bribe *employés* with money, to make surveys, to photograph and sketch in the vicinity of fortresses, are forbidden by the laws of all countries, and the reconnoitrer must be careful of infringing any of these laws.

There are no laws against studying existing maps issued to the public; therefore, the actual reconnaissance may be limited to mentally bringing information up to date and noting changes: in a large fortress noting, not the trace, except in so far as it deviates from the plan in possession, but revetments, whether covered, and of what material, etc., commands, casemates, new works, etc., *i.e.*, details not shown by a glance at a map.

The map of the surrounding country must be carefully studied and the position and communications thoroughly reconnoitred; the military history of the ground—*i.e.*, battles fought over it, sieges it has witnessed, etc.—must be learned beforehand.

In the case of works of moderate extent and simple trace the reconnoitrer need but leisurely pace its chief lines, noting direction, profiles and lengths; memory and eye will not fail to enable him to retrace his footsteps on paper and to lay down sketch profiles sufficiently accurate for all practical purposes. This should be done on the very first opportunity that offers, and the works again visited, if possible, to test its accuracy and to make additions.

"Snap-shots" by Kodaks can be taken without attracting observation and enlarged at leisure with excellent results, but the most zealous seeker after information must be careful to do nothing that may compromise his Government, and remember that the police exercise the right of searching the baggage of suspected persons. He may often have to adopt a shorthand and symbols of his own, and to jot down notes where they are least likely to be looked for or recognised as notes if found.

On account of the restrictions placed upon the free action of a reconnoitrer it is often better for him to have nothing whatever to say to the authorities of his own country; he can always claim from them the consideration due and invariably conceded to travellers, beyond which nothing is required.

Para. 32.

It is beyond the scope of this paper to enter into the solution of the astronomical problems involved in fixing latitude and longitude; it will suffice to explain the observations required to be taken, *i.e.* :—

1. Determination of the index error of the sextant.
2. Determination of the altitude of the sun or a star.
3. Determination of the stars crossing the meridian and approximate time of doing so.

The relative positions of the principal stars can be readily determined by means of a star chart.

Sextant Error.

Obtain the index error by observing the sun with the images in contact, and causing them to traverse one over the other. Let the readings be R^1, and R^2; then the index error is half the difference of the two readings on or off, according as R^1 is greater or less than R^2

N.B.—One-fourth of the sum of the two readings equals the semi-diameter of the sun, given in the Nautical Almanack for each day of the year. This checks the above observation :—

If the readings are both on or both off, the index error would be the sum of the two readings.

Or :—Obtain by observing a star or very distant object and making both images coincide; the reading on the vernier then gives the index error.

The necessary instrumental adjustments are given in works on surveying, etc.

Altitude of the Sun.

The lower limb (L. L.) of the sun is observed in the morning, when the mercurial sun (sun seen reflected from the mercury) is rising (using the astronomical telescope).

Bring the two images to a slight overlap and note the time at the instant of its disappearance. This must be repeated about seven times as rapidly as possible in order that a correct mean may result.

The upper limb (U. L.) must be observed in the afternoon, when the mercurial sun is sinking.

The morning observation should be taken about 8 or 9 a.m., and that in the afternoon about 3 or 4 p.m.

N.B.—The image of the sun in the mercury is inverted. An astronomical telescope inverts an object or image observed.

In taking a meridian altitude of the sun, bring its two images into exact contact on the L. L., *i.e.*, with the mercurial (rising) sun at the top; keep contact by the tangent screw, bearing in mind the direction in which you are turning the screw and never turning it in the contrary one (to do so is fatal to the observation). So soon as an overlap occurs instead of a gap, the sun's greatest altitude has been attained and the sun's motion in the heavens has been reversed. The reading of the instrument gives the sun's meridian double altitude from which the latitude can be readily deduced. This observation, which must be begun a little before apparent noon, also gives the time of local noon. When a star is observed the two images are made to coincide.

Every night take the altitude of the Pole star, noting time. Having set the sextant to double the approximate latitude, the star and its reflected image will be found readily in the field of the mercurial horizon:—

Be careful to see that the mercury finds its own level.

Use the astronomical telescope on all occasions.

Keep watches at Greenwich time.

Stars Crossing the Meridian.

By sextant and artificial horizon the altitude of a heavenly body cannot be measured unless it is between about 15° and 60°.

A star to be observed must therefore come on the meridian during the night and at an altitude of between 15° and 60°. It should be of the first or second magnitude. Having consulted a star chart and the heavens, and thereby determined the names of the stars near the meridian (approximately a great circle passing through the Pole star), to obtain the approximate apparent time of any one of them passing the meridian by means of the tables given in the Nautical Almanack, subtract the sun's right ascension from that of the star (increasing the star's right ascension by 24 hours if it be less than the sun's right ascension), and the remainder is the time required.

The altitude of any star when passing the meridian equals the sum of the co-latitude (90-latitude) of the place and the declination of the star, when both are north or south, or their difference when of contrary names; the altitude to be reckoned from the south point of the horizon when the latitude is north, and the contrary when south; but when the sum exceeds 90° it is to be taken from 180°, and the altitude is to be reckoned from the north in north latitude and the south in south latitude.

All astronomical observations to be balanced and weighed and noted as "very good," "good," "doubtful," etc.

If possible, go through the course recommended by the Royal Geographical Society prior to starting on the reconnaissance.

THE CAVALRY EXERCISES BEFORE AND THE CAVALRY DURING THE MANŒUVRES OF 1898.

By Major C. G. MORRISON, p.s.c., The Royal Dragoons.

Thursday, March 9th, 1899.

Lieut.-General Sir Frederick W. J. FITZWYGRAM, Bart., M.P. (Colonel of the 15th Hussars), in the Chair.

WHEN the Council of the Royal United Service Institution did me the honour of inviting me to read a paper at the Institution on the above heading, I hesitated to accept the invitation. Onlookers, it is well said, see most of the game, and as, during the cavalry exercises and the subsequent army manœuvres, I was not, in my capacity of squadron leader, well placed for taking a general view of the progress of events, it seemed to me that there must be many officers better situated in this respect than myself, to whom the Council could look for more complete and more detailed information than my limited opportunities for observation enable me to offer.

On the other hand, it was evident that the chief object which the Council had in view in arranging this lecture was, not to ventilate the ideas of an individual lecturer, but, rather, to start a discussion on a subject of great interest to the Service at large, and to cavalrymen in particular; and this end it seemed possible to attain, even in the absence of a complete review of all that took place during the drills and manœuvres.

At the end of June the cavalry commenced to concentrate at Bulford, 11 miles from Salisbury, the 13th Hussars from Ireland being the first regiment to arrive, followed on 30th June and 1st July by the Royal Dragoons, who reached Bulford by march route from Hounslow, Hampton Court, and Woolwich. The 10th Hussars arrived a day or two later, but it was not until the 15th July that the 2nd Brigade (Colonel French) was completed by the advent, by march route, of a composite regiment formed of a squadron from each of the three regiments of Household Cavalry. Two companies of mounted infantry joined this brigade on 15th and 16th July. Meanwhile, on or about the 15th July, the 4th Cavalry Brigade (Colonel Dickson), consisting of the 2nd, 3rd, and 7th Dragoon Guards, had also assembled in camp. These regiments, being on the lower establishment, were not nearly so strong as the regiments of

the 2nd Brigade, the squadrons in which each numbered about 160 men and 128 to 136 horses. On the 6th August the 12th Lancers and 15th Hussars marched in from Aldershot, forming, with the 13th Hussars already in camp, a battery R.H.A., and two companies of mounted infantry, the 1st Cavalry Brigade, under Major-General the Hon. Reginald Talbot.

In regiments on the higher establishment, service squadrons are supposed to have in their ranks none but fully trained men. I cannot say how other regiments were situated in this respect, but I am able to state that in the ranks of the Royal Dragoons at Bulford there were no fewer than 93 undismissed recruits. In my own squadron there were 29. Since January, 1898, I have had 39 men transferred to my squadron from the reserve squadron, and of these only one was a trained soldier. All the others were recruits in various stages of training, the twelve men last transferred to me not having been to riding school at all. In a strong regiment it is difficult to see how the reserve squadron is to do the work for which it was designed. In the reserve squadron Royal Dragoons, there were, at the end of December, 1897, 44 recruits. The decrease (waste) in the regiment from various causes during 1898 amounted to 167 men, and the recruits who joined numbered 129. The reserve squadron had thus during the year to deal with some 173 recruits, for whose training it was responsible, and had no recruits been transferred to service squadrons until they were dismissed, it is evident that the reserve squadron would have been hopelessly overstocked, while the service squadrons were in want of men to groom the horses. Yet, with the transfer, as a regular system, of untrained recruits from the reserve squadron to the service squadrons, the *raison d'être* of the former practically disappears.

That the recruits at Bulford did wonderfully well, all things considered, may be freely admitted, but nevertheless, it is obvious that leaders and others must be seriously handicapped by the presence of so many untrained youngsters in the ranks of a squadron which presumably contains none but fully trained soldiers.

In the matter of horses we were better situated. The regulations enjoin that the service squadrons of regiments in the 1st and 2nd Brigades shall, as far as possible, be composed of animals fit for active service, and horses shall not be ridden at any manœuvres of all arms until they are six years old. In my squadron at Bulford there were only eight horses not fulfilling this requirement.

The cavalry camp was situated on Bulford Down, a position in itself very favourable for the purposes of an encampment. In two respects, however, the site chosen did not prove advantageous. In the first place, the distance from the camp to the nearest point of the downs available for drill or manœuvre was not less than from 4½ to 5 miles. No doubt the difficulty of finding any suitable site fulfilling the needful conditions of water supply, in closer proximity to the Government ground on Salisbury Plains, led to the selection of Bulford Down as the place of encampment; but it will be observed that the position chosen necessitated at least a 10-mile march going to and returning from the manœuvre area, apart from the work to be done on the ground itself. In the second place, it must

be confessed that even at Bulford the water supply proved a source of much tribulation and vexation of spirit. The camp depended for water, both for men and horses, upon a well on the slopes of Beacon Hill—a commanding ridge which bounds Bulford Down on its south-eastern edge. At the outset this source of supply was quite satisfactory, but, with the advent almost daily of fresh troops, and the absence of any rainfall, the well, after a short time, proved inadequate to the serious calls made upon it. Recourse was then had to the River Avon, and on "rest days," *i.e.*, those days on which the troops did not go to the downs, and consequently did not cross the river in the ordinary course, the regiments had to proceed to the Avon once, for the purpose of watering the horses. On the 2nd Brigade, which watered at Millston and Durrington, this entailed a midday journey of 5 miles there and back. To supplement the river supply—the well on Beacon Hill being by this time no longer equal to the task of supplying any water for horses—wells were sunk in the dry bed of a watercourse which flows, or would flow when there is water in it, along the western extremity of Bulford Down. At the time of which I am now speaking a blue line on the Ordnance Map, and the somewhat imposing title "Nine Mile River," were the only indications of the existence of a stream at all in this neighbourhood. The pumping of water, by means of hand-pumps, from the wells thus sunk, was a slow and tedious process, and the water when obtained was somewhat of the consistency of whitewash; so that altogether as a watering-place twice a day for nine regiments of cavalry, two companies of mounted infantry, Royal Engineers, Army Service Corps, and other details, the conditions were none too favourable.

No account of a cavalry camp of exercise would be complete without a reference to the condition of the horses during its progress and at its conclusion. I believe I am not laying myself open to the possibility of contradiction when I say that, taken all round, the condition of the horses was most satisfactory, a statement that will be endorsed by the common knowledge of officers who were present at the time, and was attested by expressions of approval from the Commander-in-Chief, the Adjutant-General, H.R.H. the Duke of Connaught, and the Inspector-General himself. Whereas usually the strain of continuous work is the chief cause of that falling-off in condition which is to some extent inevitable, we had here to combat a peculiarly adverse element, namely, scarcity of and want of quality in the water available for the horses; while as regards the Avon it may be observed that after a return journey along the dusty roads which connected that river with the camp, the horses which had just been watered really required to be watered afresh. Yet in spite of these adverse circumstances the condition of the horses was distinctly satisfactory, a fact which shows that, when care and attention are devoted to horses, even an inferior water supply may not prove as detrimental to them as would ordinarily be expected.

A word of thanks may fitly be reserved for Lieut.-Colonel Templer, to whom, towards the conclusion of our sojourn at Bulford, we were indebted for the ultimate relief of our necessities. This officer undertook

to supply the camp with water from the Avon, and within eight days of receiving the necessary permission he had laid down his pipes, his engines were at work, and were pumping with such vigour and success, that an urgent telephonic message had to be despatched begging him to stay his hand lest the camp should be flooded. Changed times truly for the "drought-stricken" field of Bulford!

The quality of the forage supplied left a great deal to be desired, but the quantity was sufficient if the quality had been satisfactory. At first the allowance per horse was 16 lbs. of corn and 6 lbs. of hay. After a time this was changed, first to 12 lbs. of each, and subsequently to 14 lbs. of corn and 8 lbs. of hay, which was the ration during the actual manœuvres. It would be interesting to learn the views of officers as to the best distribution of the 22 lbs. of forage which usually constituted the ration available for each horse. In the opinion of many, 6 lbs. of hay is too small a quantity for troop horses, while 16 lbs. of corn is more than they can properly assimilate and digest. Moreover, on an allowance of only 6 lbs. of hay the horses get little more than a handful at each feed, and they have nothing to play with, so to speak, or keep them occupied in the lines. Probably 14 lbs. of corn and 8 lbs. of hay is the better ration of the two. In any case, it may be suggested that a gradually increasing amount of extra forage might with advantage be issued in anticipation of the concentration of the troops for the summer drills. By this means extra condition would be put on to provide against the waste which the severe strain of cavalry manœuvres necessarily entails, and this would appear to be preferable to the present system of relying upon extra forage to repair this waste when it has actually occurred.

I am indebted to Vet.-Lieut.-Colonel Clayton, Army Veterinary Department, for some remarks on this subject, which I think cannot fail to be of interest. Colonel Clayton would leave to officers commanding, and veterinary officers, the decision as to the amount of forage to be drawn for the troop horses, they being empowered to draw what their horses can digest, and not one ounce more. "If," writes Colonel Clayton, "they can eat 16 lbs. of corn—which I doubt—digesting it all round, then give it them; but what I should do would be to put them up gradually, pound by pound, as the work increased, until I arrived at 14 lbs., the maximum they could digest. It must not be forgotten that it is no use pouring corn into tired, hardworked horses, for it only upsets digestion, causes colic, and leads to loss of horseflesh. A horse can only be worked, and kept in condition, by paying attention to his assimilative powers. No quantity of stuff will keep a horse in condition unless his constitution—to use a common word—enables him to digest it. 10 lbs. thoroughly digested will produce better effect than a greater quantity only partially assimilated. But it is most difficult to lay down a hard and fast rule; you cannot treat all horses alike, and that is where stable economy comes in, and the fruits of close supervision are seen. Whatever the ration of corn may be, the horse must get some ballast in the shape of hay, and I should fix the ration at 8 lbs. at least. Without such ballast horses are bound to fall away."

Colonel Clayton further suggests that size has more than anything else to do with feeding, and he expresses the belief that thousands of horses are every year ruined by over-feeding. From this cause horses contract fever in the feet, eye mischief, etc., while many go "all to pieces" because their digestive apparatus has been damaged by injudicious feeding (cramming). Colonel Clayton seems to favour a system of feeding four times a day, and suggests that a suitable ration of corn would be as follows:—For horses 14 to 15·1 hands, 10 lbs. a day in four feeds; for horses 15·1 to 16 hands, 13 lbs. in four feeds. Horses over 16 hands might have a ration of 15 lbs. "If the work becomes very hard these quantities might be increased a wee bit if the digestive organs will stand it."

As regards shoes and shoeing, some facts may be of interest. The ordinary allowance of cold shoes (50 per cent.) is—during the period for drills and manœuvres—increased to 75 per cent. The duration, or "life." of a cold shoe may be taken as one month under normal conditions of wear; but where any considerable amount of road work has to be done, a fortnight is probably the outside limit, while in many instances machine-made shoes will not hold out even for that time. My own squadron, for example, was completely shod up for the march to Bulford, the shoeing of the squadron extending over a fortnight. We had then three marches of 24, 18, and 33 miles respectively, and on arrival at Bulford all the horses required to be shod afresh. Similarly, the squadron was shod up for the army manœuvres, the work on this occasion being completed within a week. The march to Blandford took two days, the manœuvres lasted six days, and the return journey by march route took five days, including a Sunday halt at Guildford. On arrival at Hampton Court the majority of the hind shoes were completely worn out, in many cases only half a shoe remaining, and this in spite of the fact that the shoeing smiths were constantly at work, both in billets and on the line of march, replacing—in pairs—those shoes which showed most signs of wear.

A device which has been found to work well is the inserting of a small piece of steel in the toe of the hind shoe, a plan which greatly increases its durability. A machine-made shoe will then last, even under the conditions of road work already referred to, for three weeks instead of a fortnight. The insertion of this piece of steel after the shoe is manufactured is, however, a troublesome and somewhat difficult process, and the suggestion is made that cold shoes might be issued in the first instance with steel tips let into the iron of the toe. Against this there is of course the consideration that the hardening of the toe might be inconvenient as regards fitting the shoe to the horse's foot. This is a question for expert opinion, but I may say the view taken by not a few farriers and shoeing-smiths of practical experience is against the suggestion that there would be an appreciable difficulty in fitting a cold shoe in consequence of the presence of steel in the toe. Machine-made shoes provided with steel tips have, however, I am informed, been actually issued ere now, and possibly we may hear with what results.

The gain in durability by the adoption of some such device would undoubtedly be very great, and the suggestion is therefore put forward as a matter for discussion.

A flat shoe, that is to say, a shoe not concave and without fullering, has, I believe, been tried with very satisfactory results, and has proved more durable than the present pattern.

The subject of saddles and saddle fitting—all-important as it is—presents too wide a field for discussion within the scope of this paper. The small percentage of sore backs in the Division, however, seems to point to satisfactory results from the present saddle. There is one broad question on which light might be thrown, and that is whether a fully equipped military saddle should or should not be tightly girthed to the horse. In his admirable "Manual of Saddles and Sore Backs" Veterinary-Major Smith places a loose girth amongst the chief offences which come under the heading "Bad Saddling." On the other hand, it is often urged that by fixing the saddle tightly down on the horse's back you contribute greatly to the chances of inflicting injury, and instances are cited of Australian and American "cowboys" who ride in heavy saddles with comparatively loose girths, and yet enjoy immunity from sore backs to their horses.

The wooden picketing pegs were not an unqualified success. Many of them were too short and got no grip in the ground. They easily split, especially when used in the hard chalk soil at Bulford and elsewhere, and owing to the numbers thus rendered unserviceable there were, towards the end of the manœuvres, insufficient pegs for the security of the horse lines. The heel ropes were even less satisfactory. They were too short, and were not strong enough to stand the wear and tear to which they were necessarily subjected.

The period from 1st to 17th July was devoted to regimental drill, and inspections by the Inspector-General of Cavalry. Regiments took it in turn to drill before and after breakfast on the northern portion of Bulford Down, where there was just sufficient space for one regiment to manœuvre. There were at this time some seven regiments of cavalry in camp, and those regiments which were not detailed for drill near the camp, drilled on the Government ground beyond the Avon.

Dealing with points which came specially to notice at this time, it may be remarked that the 1898 Drill-Book is notin all respects a complete guide to the details of cavalry drill. The accepted principle in the present day appears to be that in the training of a troop or squadron the closest attention should always be paid to matters of detail, and the utmost exactitude should be aimed at in the minutiæ of drill. In regimental drill a strict adherence to fixed methods and definite formations is less observable, while in the case of manœuvre—as applied to the larger units, the brigade and the division—it is not intended that the cavalry leader shall be hampered by detailed instructions of a binding character. One of the Inspector-General's addresses to the assembled officers during the divisional drills was devoted to this very point, and Sir G. Luck laid stress on the fact that officers are expected and required to exercise their

own udgment in adapting the instructions which the Drill-Book contains, and which are not intended to be more than a general guide as to how certain movements may suitably be executed.

Nothing could be sounder than this view of the scope and intention of the Drill-Book instructions, so far as they concern the more extended sphere of manœuvre; but this does not alter the fact that the Inspector-General himself very properly exacted the utmost precision, both in word and deed, in troop and squadron drill, which form the foundation of cavalry efficiency in the field. The Drill-Book, however, though apparently recognising the necessity for precision in certain cases, is not always itself precise. For example, under the heading Troop Drill the instructions for increasing and diminishing the front, and for executing formations, are by no means as clear as could be wished, though this section of the Drill-Book, of all others, furnishes the most favourite test of the knowledge of detail possessed by officers, non-commissioned officers, and men. In squadron drill it is laid down that movements by fours, sections, etc., are to be performed in squadron "in exactly the same manner as laid down in troop drill," but it is not stated by whom—in squadron—the necessary words of command are to be given, a point of considerable importance where four troops are present instead of one. Still more remarkable is the fact that for dismounted service, on which much stress is now laid, no words of command at all are given for the movements of the dismounted men; while the arrangement which necessitates a reference to the Rifle and Carbine Exercises for even the simple commands by which fire is controlled and directed, does not tend to promote precision in a matter in which precision is of the utmost importance.

In regimental drill a question of much interest arose in connection with the maintenance of direction, during the advance in line, by squadrons other than the squadron of direction. The Cavalry Drill, having fixed the responsibility of the "officer of alignment," proceeds as follows:—"The directing troop leader of every other squadron regulates his pace and direction in accordance with the movements of the squadron of direction." It may be said at once that in practice this is found to be impossible. The troop leader of the second troop of the first squadron cannot possibly maintain a correct interval from the directing troop leader of the centre squadron, *i.e.*, the "officer of alignment." Between him and the latter are interposed three troop leaders whose presence he must ignore, and the frontage he has to estimate "while looking principally to the front" is that of four troops plus the squadron interval. Applying the same principle to brigade drill, the difficulty increases immensely. The directing troop leader of the second squadron of the regiment on the right of the line has to maintain a correct interval for his regiment from the officer of alignment of the centre regiment—an utter impossibility. The hopeless nature of the task thus set to troop leaders, and the failure which invariably attended the attempt to conform in this matter to Drill-Book instructions, led eventually to the issue, with the sanction of the Inspector-General of Cavalry, of an order to the effect that the inner

troop leader would in future be the directing troop leader of all squadrons other than the squadron of direction.

The period from 18th to 30th was devoted to brigade drill and inspections, with one day for outpost work. Owing to the scarcity of water in camp, regiments took it in turn to precede the brigade to the downs, parading early, watering *en route*, and carrying the morning feed on the saddles. The 2nd Brigade formed as a rule on Knighton Down, and was exercised sometimes as a first line and at others as a second line, or even as forming a second and third line.

The use of signals instead of trumpet-sounds or words of command, formed a prominent feature in connection with the brigade drills, and subsequently also in the divisional exercises. It would be well, perhaps, if the object of thus employing signals could be clearly defined in the Drill-Book. Primarily, of course, the avoidance of noise, and consequently of the sense of confusion to which a multiplicity of commands or trumpet-sounds may lead, is the great object to be gained by the substitution of a silent system of drill. But it may fairly be argued that this consideration scarcely applies to the case, for example, of a brigadier who, under ordinary circumstances, might well be permitted to initiate the more important movements—formation of line to the front, for instance, prior to the charge, and the charge itself—by means of trumpet-calls, even though regimental commanders and squadron leaders might be restricted to the use of signals for carrying out the orders thus conveyed. Unquestionably a certain amount of difficulty arises where the brigadier works by signal alone. Riding ahead of the centre of his brigade and surrounded by his staff and gallopers, the signals of the brigadier are not always distinctly visible to the commanders of flank regiments, even in the absence of dust, as on Salisbury Plains. In any case the commander of the centre regiment will probably be the first to see the brigadier's signal, and will act upon it soonest, with the result that line will not be formed simultaneously, and that the flank regiments will often appear to be slow in executing the orders of the brigadier. During the brigade drills last summer the best and most successful formations to the front preparatory to attack were those initiated by the field bugle-call of the brigadier; whilst, on the other hand, there were many instances, where signals only were employed, of failure due entirely to the difficulty of seeing these signals. There are other considerations of even greater importance. Any one officer mistaking a signal, from whatever cause, may lead to a number of squadrons going wrong by following his example. Again, when working by signal the commanding officers look to the brigadier, and the squadron leaders look to the commanding officer. If the latter, as might easily happen in action, is suddenly placed *hors de combat*, there is nobody to pass on the signals of the brigadier. Or a squadron leader may come down at the critical moment, and no one else in his squadron is supposed to know, or indeed is in a position to know, what the brigadier and the commanding officer are signalling. On service very serious results might follow upon *contretemps* such as these. Of course, cavalry may often be afforded the opportunity of effecting a

surprise, and in such cases the execution of manœuvres entirely by signal attains a practical importance in excess of anything to which the system can lay claim for ordinary purposes. The employment of trumpet-calls might, and probably would, under such circumstances disclose the presence of the cavalry and thereby defeat the object in view.

But, admitting this, the question for the moment is whether, in the instances which so frequently happened on Salisbury Plains last year, of opposing bodies of cavalry coming in full view of each other at a distance of half-a-mile away or more, anything is gained by brigadiers using signals instead of field bugle-calls when forming their brigades for attack. A very high authority has said :—"If the trumpet give an uncertain sound, who shall prepare himself to the battle?" How much greater may not the difficulty be when the trumpet gives no sound at all!

Whilst on this subject of signals, it may be noted that one signal, namely, "arm waved from a perpendicular to a horizontal position in the required direction," is made in the Cavalry Drill to do duty either as a signal that the head of a squadron is to change direction, or that troops are to wheel to a flank. The result of making this signal do double duty is to render the signal itself almost useless. Taking the case of a regiment in squadron columns, there is obviously the most marked difference between the effect produced by a wheel of the heads of squadrons, and that which results from a simultaneous wheel, or half wheel, of troops. Yet a squadron leader who "waves his arm from the perpendicular to the horizontal position in the required direction" leaves it entirely to his troop leaders to decide what interpretation shall be placed upon a signal which may be taken as implying one or other of two distinct movements.

On one or two occasions the experiment was tried of commanding the brigade from a position in rear of it. For example, the brigade, advancing in line of squadron columns, would be wheeled about by troops, regimental commanders and squadron leaders following behind the line, after the front had thus been reversed. An attempt was then made to shoulder, and even, I think, to form line to the front, with the leaders still in rear, and serious confusion was the result. A simple retirement presents but little difficulty, provided that, as would naturally follow in most instances, the line faces to its original front, *e.g.*, in the direction of the enemy, before manœuvring of any kind is attempted. It is, however, no exaggeration to say that, with the commander and all the leaders riding behind the line instead of in front of it, manœuvring of even the simplest description is impossible. If an enemy suddenly appears in rear of a line of cavalry, and the front has to be reversed in order to oppose him, the place for the leaders will obviously be in advance of the line on the new front. If, on the other hand, the line retires temporarily preparatory to a fresh advance, there ought to be no occasion to manœuvre till the proper front is resumed, and the leaders are once more in a position of lead.

In the divisional drills, and in the tactical exercises which followed them, a prominent feature was the frequency with which "shouldering"

was employed to effect a change of direction. The Cavalry Drill defines shouldering as "wheeling on a moving pivot," and adds, "but the term is only used in certain particular cases." These particular cases were, however, of very frequent occurrence during the cavalry drills, and the fact that shouldering was employed to change direction as much as a quarter circle or more suggests a query as to whether this could not be effected by some method more in consonance with the Drill-Book principle which enjoins that units should be led to their positions "by the shortest route." It is obvious that in shouldering, the outward flank necessarily makes a wide detour, and those who recall the exhausting gallops which squadrons on the wheeling flank of a long line of cavalry had constantly to undertake in the execution of shouldering movements, to the extent of considerably more than a half-wheel, will perhaps favour the suggestion that in many cases such movements might advantageously be executed on the lines of a "change of direction" as laid down in regimental drill, rather than by shouldering.

But a point of even greater importance is the extreme difficulty of shouldering a brigade when line has been formed for attack. This also was frequently attempted, but seldom with success. From this we may learn two lessons. First, that in delivering an attack, when line has once been formed, shouldering to any but the very slightest extent may, and probably will, throw a line of cavalry into partial confusion; and that, conversely, if an attack has to be met, a great advantage will rest with that force which obliges its adversary to thus change direction, whilst itself preserving unchanged the line of advance on which it formed for attack.

Attention was frequently directed to the question of intervals in line, and the Inspector-General found it necessary to emphasise the Drill-Book instructions to the effect that "as the pace increases the intervals gradually disappear," and that "the preservation of intervals is no criterion of excellence in the charge." In fact, when the actual charge is delivered there are to be no intervals, and, as a general principle, it would seem that—if exactitude cannot be fully attained—it is an error on the right side to be somewhat crowded in the ranks rather than to have too much space, and not therefore to offer a solid front to the enemy at the moment of collision.

The flanks of a long line of cavalry have a tendency to "fly out," as the expression is, and the Inspector-General admitted the difficulties which flank squadrons experience in maintaining the general alignment, especially when changes of direction occur during an advance. Sir G. Luck was understood to sanction, under these circumstances, an *échelon* formation for flank squadrons which could not for the moment preserve the alignment, without becoming disordered in the attempt—a wise permission, since no tactical disadvantage would follow from the extreme flanks of a line being in short *échelon*, provided that the squadrons so placed were thus enabled to maintain solidity in their ranks, and to meet the enemy in compact formation.

The first fortnight in August was devoted almost exclusively to divisional drill, and it was not till the 17th of the month that a skeleton enemy, formed from the 4th Brigade, became available for purposes of manœuvre. Just prior to this date a battery of horse artillery had arrived at Bulford camp.

In preparatory formation, the division usually advanced with a brigade in column of masses on either flank of the guns, which thus occupied a central position, with the mounted infantry in rear of them. Occasionally a reserve was formed consisting of a regiment from one of the brigades, and in such case the reserve usually followed in rear of the centre.

The position assigned to the artillery was, to some extent, novel. At first the guns had moved in what may be considered as more or less their normal position, *i.e.*, in the rear of the first line. Orders were given that regiments in this line should make way for the guns to pass through, whenever the artillery was ordered to the front. But this was not found to be a convenient arrangement. The guns could not readily move out to the front, and their passage through the cavalry line caused a certain amount of confusion in the ranks. On the other hand, for the artillery to go round by a flank necessitated a wide detour, and much galloping. Probably these considerations led to the adoption of a central position for the artillery in line with the brigades on either flank. Thus situated, the guns, having no cavalry in front of them, could advance quickly when required for action, but it may be observed that any but a direct advance on the part of the artillery would complicate matters almost, if not quite, as effectually as did their passage through the line in the earlier arrangement. That is to say, the guns must necessarily incommode the cavalry if ground be taken even indirectly to a flank. The result appeared to be that in the attack order the artillery maintained, as a rule, the central position it had occupied in the preparatory order, and came into action in the centre instead of on, or in advance of, a flank.

A question at once arises as to whether a central position is suitable for guns acting with cavalry. Both the Artillery and Cavalry Drill-Books seem to favour a flank position for guns under such circumstances, on the assumption that the fire of artillery on a flank will be less liable to be masked than if the guns are posted centrally; while the idea is also held that by pushing forward artillery on the non-threatened (or least threatened) flank, the enemy must either submit to be enfiladed while attacking the cavalry, or to be taken in flank while assailing the guns. When, however, the guns take up a central position, these advantages are lost. Still, if the Drill-Book principles be adhered to, and if the artillery in the preparatory phase follows in rear of the centre of the first line, the question as to the manner in which the guns are to get rapidly to the front when the moment arrives for bringing them into action is a problem which still remains to be solved.

The mounted infantry generally accompanied the artillery and formed its escort. We may, perhaps, have the advantage of hearing from

officers of the mounted infantry what view they took of the *rôle* assigned to them during the cavalry drills and exercises. In divisional drill they seemed to form a species of reserve following in rear of the artillery, and manœuvring much in the same way as a body of cavalry. When the artillery came into action the mounted infantry supported the guns by dismounted fire. It was not apparent that many opportunities were afforded this valuable and efficient force of developing its powers of offence and defence, except in the limited and somewhat conventional sphere of escort to the artillery.

When the division moved forward in preparatory formation it was usually preceded by an advanced guard formed strictly on the lines suggested for a squadron in the Cavalry Drill. Thus the brigades, with artillery in the centre, would advance across the open expanse of downs towards Stonehenge, covered by a squadron divided up into the customary advanced party, support, and reserve. It is, perhaps, open to question whether an advanced guard so formed is suitable as a covering body for a Division in open country. Under such conditions reconnaissance would seem to be the only object to be attained, the fighting element being naturally supplied by the Division itself. Why then, it may be asked, form a support and reserve to a detachment whose duties are limited to scouting for the enemy, and, by ascertaining and reporting his position and movements, securing the main body of the cavalry from surprise? If the enemy is suddenly encountered, what is to become of the advanced guard formed as described? Will it engage the hostile cavalry? Will it retire in face of the enemy; or will it withdraw, clearing the front? If either of the two first-named courses be adopted, the advanced guard may seriously interfere with the action of the Division in rear of it. If the last-named plan be followed, it would almost seem that the support and reserve might well be dispensed with in the first instance.

The Drill-Book advanced guard is no doubt well suited for work in close and intersected country, where patrols may be effectually checked by small parties of the enemy, while the covering force may at any moment find its progress barred at a defile, or may itself have to resist a hostile advance. It is not so clear that an advanced guard on Drill-Book lines, and half a mile or less ahead of the Division, is either necessary or effective in open country.

The tactical exercises against a skeleton enemy, and subsequently by one brigade against the other, were anticipated with much satisfaction as promising to afford valuable instruction, and as a relief from the drill movements, in brigade and division, which, by the middle of August, had become somewhat monotonous. It is doubtful if in many cases the expectations formed on this head were realised. It seemed as if all attacks must proceed on stereotyped lines, notwithstanding the discouragement publicly meted out to the advocates of fixed forms whether for drill or manœuvre. Attacks were almost invariably delivered frontally, and, when the 1st Brigade opposed the 2nd, three lines were formed in both brigades, each line comprising one regiment. The first line would charge the opposing first line, the second would engage the second, and

the third the third. The attacks being frontal, and the forces engaged numerically equal, the umpires were guided in their decisions by considerations of good order in the ranks at the moment of impending collision, and the lie of the ground as affecting the rival combatants, rather than by any question of the superior manœuvring powers evinced by either party.

In what is known as the Reconnoitring Phase in the Cavalry Drill, it is said that the commander "will consider upon which flank of the guns he will manœuvre so as to draw on the enemy." But in the divisional exercises against a skeleton enemy the guns, as has been said, were posted centrally, not on a flank, and in the brigade contests there was little or no manœuvring with the object of "drawing the enemy on" in any particular direction.

Again in the Cavalry Drill under the heading Manœuvring Phase (Sec. 27) we read that "speaking generally with units of whatever size the main elements of success during this phase are skill in inducing the enemy to adopt a disadvantageous order of formation, superior manœuvring power, and greater speed, one endeavour leading to another until the decisive limits of the attack are reached, when line must be formed and the assault pushed home without a moment's delay." It is not easy to recall the occasions on which during either the drills or manœuvres the above principles were practically applied. At times the enemy was certainly subjected to attack while in a disadvantageous order of formation, but this was the result of action in the nature of surprise, and was not, as a rule, brought about by skilful manœuvring. Surprises when they occurred were in most instances effected by one force lying in wait for the other in some hidden position, and issuing thence to fall suddenly and violently upon the foe—a procedure differing somewhat from the adroit and rapid movements in the open which we are accustomed to associate in our minds with the idea of a dashing and successful cavalry.

In the manœuvring phase we are further told that the first line is to manœuvre to place itself "within attacking distance of the enemy in such a position as will ensure a distinct advantage in the attack, which may consist in being able to strike the enemy more or less in flank, or may result from ability to attack with superior force and effect, owing to having better ground on which to work, or from having been able to adopt a more skilful order of formation in which to execute the attack." It may fairly be said that in the contests as they actually occurred the cases were exceptional in which a distinct advantage rested with either side, nor, except very occasionally, could either party claim to a more skilful order of formation than that of its adversary, inasmuch as the formations adopted by the rival brigades were practically identical in every instance. Of course, advantage of ground, and occasionally superiority of force also, came into play, but a feature of the exercises and manœuvres under discussion seemed to be the absence of that active manœuvring in face of the enemy on which so much stress is laid in the Cavalry Drill.

The cavalry combats in fact on Salisbury Plains, and during the army manœuvres, presented a somewhat different aspect from that which the Drill-Book sets forth under the heading The Cavalry Fight (Sec. 25). The endeavour to "establish from the outset a moral superiority over the enemy" was not always apparent, nor was he, by taking the "resolute initiative" spoken of in the same paragraph, "forced to conform to movements which have for their object to draw him into ground favourable to one's own troops." On the contrary, he was generally lured to his destruction, so to speak, by a quiescent attitude on the part of his opponent, a policy which certainly on several occasions was crowned with success.

The question whether, in the circumstances as they occurred, active manœuvring would have been preferable to the policy of "ambush" so often adopted by one or other of the two sides, opens a wide field for discussion. Thus much however may be said. The practice which the adoption of more active tactics would have afforded to leaders of all ranks in the handling of troops in the field against opposing cavalry could scarcely have failed to be of the utmost value. In mimic warfare of this nature the question of one side or the other gaining the day is, or at least ought to be, of no consequence whatever. The important point would appear to be that such opportunities—and they occur none too often—should be availed of for the practice of those active manœuvres on which alone, in the case of cavalry against cavalry, the mounted arm can confidently rely for success.

Three main conditions may be suggested as requisite for effective cavalry action. In the first place, to obtain the best results in a cavalry battle the method of attack must be unforeseen by the enemy. This does not mean that the attack itself must necessarily be unforeseen, but that, by skilful manœuvring, the enemy should be deceived—or at least kept in doubt up to the latest moment—as to the real direction from which the blow will descend.

Secondly, that to operate successfully on this principle there must be ability to adopt one of several plans with readiness and certainty, an end which cannot be attained by invariably adhering to one set formation.

Thirdly, that the commander must be able to commit the execution of any such plan to his subordinate commanders with a fair chance of their intelligently co-operating and carrying out his general idea. To this end increased responsibility must be thrown on commanders of lines, of regiments, and even of lesser bodies; and at drills and manœuvres every effort should be made to encourage and promote in subordinate commanders that judicious exercise of independent judgment and initiative which, in actual conflict, will constitute the chief guarantee for success.

As illustrative of the nature and scope of the work done by the cavalry, I propose to deal in detail with the events of a few selected days during the progress of the drills and manœuvres.

On the 19th August the 2nd Brigade, from a temporary camp at Compton, was opposed to the 1st Brigade from Bulford. The Special

Idea for the former required it to screen from the enemy's observation an army corps marching from Devizes to Upavon, the march of the corps in low ground being hidden by a stretch of upland known as the Ridgeway, south of the Devizes-Upavon road. The brigade was specially to oppose any attempt on the part of the enemy to gain the high ground overlooking this road. The camp at Compton was struck, and everybody ready to move fairly early, but owing to a delay in the receipt of orders a start was not made till an hour-and-a-half or more after the time at which regiments first paraded. A move was then made towards Connock Hill Farm, the point of rendezvous for the 2nd Brigade prior to the commencement of the day's operations. Connock Hill Farm is situated at the head of the valley in which the camp was formed, and distant from it only about 4 miles. Owing, however, to an error in direction, the brigade executed a wide detour, and had consequently to hasten its pace in order to reach the rendezvous by the hour named. This was the hottest, and on the horses the hardest, part of the day's work; but indeed later on, during the army manœuvres, we frequently experienced hurried movements of the same sort. Delays would occur at starting owing to roads being blocked by infantry columns, or by baggage trains, etc., and also from other causes, so that it often happened that a ride of several miles to the rendezvous had to be conducted at a very fast pace. A strong cavalry brigade on the march forms a long column, and if the head of the column is led at a brisk trot, the rear must be galloping more or less all the way in order to keep up. If, under service conditions, the importance of husbanding the resources of your cavalry till the enemy is met, be admitted, nothing but extreme urgency would seem to justify an avoidable expenditure of horse-flesh in the preliminary stage of a sham-fight.

Arrived at Connock Hill Farm, the brigade almost immediately advanced rapidly for a couple of miles, and formed in column of masses in rear (*i.e.*, north) of the high ground about Ell-Barrow. Here it remained stationary for an hour or more, while a couple of officers' patrols and a squadron of the 10th Hussars went in search of the enemy. The latter after considerable hesitation, due probably to ignorance as to the whereabouts of its adversary, advanced across the valley south of Ell-Barrow. The 2nd Brigade mounted and moved westward, hidden from the enemy's view by the intervening high ground, and forming to the left for attack, descended upon the foe in three lines, each line being directed against the corresponding line on the other side. Meanwhile, the artillery, taking up a position on the left flank, had come into action, escorted by the mounted infantry, and was adjudged to have worsted the enemy's guns in the artillery duel. Victory also rested with Colonel French in the cavalry combat. His first line had been overthrown, but his second and third lines were held to have defeated the lines opposed to them, especially as a portion of General Talbot's brigade had been engaged in an attack on Colonel French's artillery, which the mounted infantry, escorting the latter, had successfully repulsed.

After a halt the two brigades, under temporary brigadiers, were again engaged. The Idea for the 2nd Brigade was as follows:—"A force

advancing from Devizes wishes to bring on an action with a retreating enemy before he can receive reinforcement. The cavalry is ordered to push on vigorously, and force the enemy to deploy." The latter having withdrawn to the vicinity of Netheravon Bake, the 2nd Brigade found itself seriously hampered in its efforts at pursuit by the presence of crops and wire—impediments which constantly presented themselves during the cavalry drills, especially of course while the crops remained uncut. The restrictions on freedom of movement thus imposed detracted much from the value of the tactical exercises for which the ground had been expressly purchased by Government.

Failing, for the reasons given above, to make good his advance, or to bring his guns successfully into action against the defenders' artillery, the brigadier was constrained to halt his brigade under cover of Black-ball Firs to the south of which he had already made an abortive attempt to debouch. The 1st Brigade then retired and took up a position in rear of the high ground known as Alton Down, with the guns in action near the crest, and the right flank of the brigade effectually protected by a field of oats. Unable to circumvent his enemy without jeopardising the prospects of the harvest, the commander of the 2nd Brigade advanced boldly across the only line open to him, and, when just clear of the expanse of crops which secured his opponents' right, formed to the left to meet the onslaught of the 1st Brigade.

Under the circumstances the situation practically possessed no element of reality, and hence probably the adoption of column of masses as a formation in which to cross a mile of open country under the full view and fire of opposing artillery at from 1,200 to 1,500 yards range. If, however, it had been assumed that the restrictions imposed by a single strand of wire, or a cornfield, represented ground really impassable by cavalry from some cause of a practical nature, a very interesting problem would have presented itself for solution, namely, in what formation should cavalry, ordered to close with its adversary, cross a fire-swept zone on a restricted front, with the certainty of immediate attack when the open ground beyond the defile is reached.

The artillery and mounted infantry, in the advance actually carried out, moved on the right flank of the massed brigade, the whole thus presenting a mark which even the most inexpert gunner could scarcely fail to hit. It almost seemed as if the occasion was one in which the mounted infantry, if given a free hand, could have emancipated itself for once from mere escort duty, by boldly engaging the enemy in order to cover the advance of the cavalry. The guns, at any rate, might well have come into action against the defenders' artillery, to prevent the latter from devoting undivided attention to the advancing horsemen.

On the left of the brigade, as it cleared the cultivation already referred to, the ground sloped gently upwards to a crest some 500 yards away, from behind which it was evident the hostile cavalry would emerge for attack. Scarcely, indeed, had the leading regiment formed squadron columns to the left, when the enemy's first line came charging over the crest. The Royal Dragoons, forming a second line on the left rear of the

first, advanced up the slope. For some moments no enemy was visible in our front; but, well assured that a second line would be found sooner or later, we wisely refrained from concerning ourselves with the action then taking place on our right front between the Household Cavalry, our first line, and the 15th Hussars.

According to the Drill-Book, the duty of a second line is to support the first, "either by operating against the flank of the enemy's first line or by encountering his second line and repelling its attack." The latter was the more usual *rôle* of the second line, and the occasion in question proved no exception to the rule. A hostile second line did make its appearance before our advance had proceeded far, and we met this line in the customary frontal attack. I confess, however, that it occurred to me at the moment that had no second line been present on the enemy's side, we on our part would have galloped aimlessly over the crest in a vigorous attack on nothing at all. We had come to regard the presence of an *échelon* in rear of both flanks of an attacking first line as inevitable, and the event proved that we were right. But if, under cover of the high ground, the order of the defenders had been varied, it is more than probable that the action of our second line in the fight would have been completely nullified, and we ourselves exposed to an attack in flank, or even from the rear.

In the cavalry exercises, and in the army manœuvres, the knowledge possessed by both sides of the strength and composition of the opposing cavalry produced a want of realism which was regrettable, but of course unavoidable. A commander who knows beforehand the exact force which his adversary can bring against him may be justified in adopting a line of action, or inaction, which, in the absence of such knowledge, would be quite inexcusable. The difficulty of remedying this evil by reinforcing one side without the knowledge of the other was exemplified on 24th August, when a regiment, recognised at once as belonging to the 4th Brigade then at Perham, was allowed to remain unmolested in the belief that it was neutral, whereas, in fact, it constituted for the day an additional unit in General Talbot's brigade. The cavalry drills were brought to a conclusion by a general horse parade on 25th August, at which the Commander-in-Chief was present. On the 29th the 2nd Brigade marched to Winterbourne-Ford camp, 2 miles from Salisbury, proceeding the following day to Blandford to join the Southern Army.

The 1st September saw the commencement of the army manœuvres, and was looked forward to as likely to prove the great cavalry day of the week's operations. The Home Army (Red) had assembled round Salisbury; the Invading Army (Blue) had concentrated at Blandford. The Special Idea for the former directed it to move on the 1st towards Shaftesbury, reconnoitring with the mounted troops towards Blandford, in order to report on the enemy's strength and movements, and to endeavour to prevent him marching northwards. The Special Idea for the Blue Force intimated that information received showed that the enemy was strongly entrenching Salisbury, and directed that, for the moment, a further advance northwards from Blandford was not to be attempted.

The Special Idea concluded with the instruction "Send out your cavalry to-morrow towards Salisbury to clear up the situation in that direction."

On the morning of 1st September the Red Army moved towards Shaftesbury in three columns, and halted about Fovant without interruption from the enemy. The Red cavalry covered the movement, the brigade being concentrated with the exception of two squadrons detached as contact squadrons. Three officers' patrols were also sent out.

The main body of the Blue cavalry took up by 10 a.m. a position in rear of high ground on Tarrant Hinton Down, about 2 miles from Blandford camp and 18 miles from Salisbury. A couple of squadrons were detached to hold special points, and officers' patrols covered the front from Cranbourne on the right to Shaftesbury on the left. The official narrative describes the operations thus:—"Contact was established by the Blue cavalry near Cashmoor with portions of the Red cavalry before 12 noon, after which hour desultory and minor actions took place between advanced parties only for some hours."

On the Blue side, desultory and minor actions were conducted by advanced parties only, because the brigade itself remained stationary throughout the day, in the position taken up at the commencement of the operations, and these advanced parties were accordingly deprived of the support which would have enabled them to press on their reconnaissances. Officers' patrols, checked by hostile parties of cavalry, failed to break through the enemy's line, being unable to command sufficient force for that purpose. It is not, therefore, surprising to read in the "Remarks" of the Director of Manœuvres, that the information required was not obtained, and that the commander of the advanced Blue Army was left in ignorance of the fact that the Red Army was that day on the march from Salisbury towards Shaftesbury.

Assuming that the only information regarding the enemy in possession of the Blue commander, was that conveyed in the Special Idea—namely, that Salisbury was being strongly entrenched—the "clearing up of the situation," to which the instructions issued committed the Blue cavalry, would, presumably, under conditions of actual warfare, have included the obtaining of full information, not only as to the whereabouts and movements (if any) of the Red Army, but as to the strength and composition of that army. Could it be hoped that this information would be obtainable by the adoption of a passive attitude on the part of the Blue cavalry brigade, as distinguished from an active advance to prosecute, at all hazards, a reconnaissance in force in the direction of Salisbury?

The Red cavalry effectually covered the march of the Red Army—a movement which, in any case, was "threatened" by no greater force than a few officers' patrols. As regards information, however, the reports received by the Red cavalry commander are officially described as "inconclusive and wanting in accuracy," and it is added, "It would have been better had he secured more certain information by pushing forward with greater vigour."

The second day's operations included a certain amount of dismounted work, but did not afford any special opportunities to the cavalry on either side. Both parties, however, did the work allotted to them satisfactorily,

and of the Blue Army it is recorded that "the work carried out by the advanced force of cavalry and mounted infantry was of value." During the progress of this day's operations, the Blue cavalry brigade appears to have been directed first towards the extreme left rear of the army, and, when no foe appeared in that direction, almost immediately afterwards to the extreme right, with a view to outflanking the enemy on that side.

On the third day the Red Army withdrew before it was attacked, which apparently was not the intention with which the Ideas for the day had been framed. The Blue cavalry rendezvous was in a field on high ground sloping towards the enemy and seemingly under view from many points, and particularly from a Red balloon about 1 mile away, which started observations a considerable time before the "flag fell" for the day's operations to begin. This balloon had subsequently to cut itself adrift in order to evade capture by Major Lindley's squadron of the Royals —this being probably the most "heroic" cavalry episode in a somewhat uneventful campaign. The Red cavalry on this day was engaged in fighting an outpost or rear-guard action. The Blue cavalry, checked by the enemy's outposts, spent most of the morning dismounted in fields by the roadside, being shot at from many directions and by many batteries. The close country rendered effective cavalry action impossible, and it seemed as if under such conditions the mounted arm was out of place in the van of the attack.

The fourth day's operations included much cavalry work in which both brigades did well, and the Blue cavalry in particular in "its delaying action against Red infantry acted with discretion and promptitude and effected its purpose in a satisfactory manner." I am unable to deal with the occurrences on this day from personal observation, as I was not present, being detailed to take charge of the baggage column, an experience which impressed me strongly with the absolute necessity for a careful reconnaissance beforehand of the road which a baggage train is to follow on the march, so as to obviate the evil of having to negotiate desperately steep gradients which might be altogether avoided by a very slight deviation from the direct route. A quaint episode in the day's operations was the accident which resulted in both brigades arriving at the same spot for their initial place of rendezvous. After friendly greetings across the hedgerow which alone separated the hostile forces, the combatants were ordered to withdraw to their respective "corners," hastily fixed by the umpires at a distance of about a mile apart.

The fifth day's operations seemed to offer opportunities for cavalry action of which more advantage might have been taken. The position round Yarnbury Castle—an ancient earthwork commanding a wide expanse of rolling downs—was occupied only by a rear guard of the Red Army, not by the army itself, as the Blue commander-in-chief at first supposed. This was a point which could only be cleared up by pushing boldly forward with the cavalry to reconnoitre in this direction. After a hasty movement to the point of rendezvous, however, the brigade remained halted under cover, while officers' patrols were sent out, and a squadron only was despatched towards Yarnbury Castle. The prevailing idea seemed to be to fall successfully upon the opposing cavalry brigade,

rather than to press a strong reconnaissance against what seemed to be the main infantry position, and to take chance, so to speak, of having to encounter and defeat the hostile cavalry in order to effect this definite purpose.

Yet nothing succeeds like success, and the Blue cavalry was successful. Two horse batteries were first attacked and overwhelmed, and immediately afterwards another portion of the Blue brigade, sweeping over the hill-top, joined the squadrons which had just assailed the artillery, and with them succeeded in repelling an onslaught by the main body of the Red brigade, the latter, after a short halt, being ordered to retire. But the victory of Blue did not appear to be at all decisive, inasmuch as the retreating enemy was not followed up; indeed, after remaining dismounted for twenty minutes, during which time the infantry passed to the front, the Blue brigade mounted and moved off—not towards Yarnbury Castle, the direction taken by the Red cavalry when retiring, but away to the extreme left, in order to seize and hold a village on that flank. The mounted infantry did not keep with the brigade on this occasion, although the work in hand was of a nature for which mounted infantry is peculiarly fitted.

Contact with the enemy once established, must, we are taught, never be lost. If this applies to patrols and other small detachments, how much more applicable would it seem to be in the case of a force which has successfully worsted its adversary in a cavalry battle! Difficulties of umpiring, no doubt, led to the Blue brigade being denied the advantage it would have gained by following up its success, but if, as appears to have been the case, information as to the force actually holding Yarnbury Castle was not forthcoming till the entire Blue Army was already committed to an advance against that position, the failure may be accounted for, in some measure at any rate, by the fact that the Blue cavalry was not permitted to push home its reconnaissance at the heels of its retreating adversary.

In the earlier part of the concluding day's operations the cavalry was seriously hampered in reconnaissance work by the presence of a thick mist. Nevertheless we read in the official remarks that "The reconnaissance by the Red cavalry of the river crossings, on the results of which the dispositions made by the commanders of the 2nd and 3rd Divisions for the passages of the river depended, was efficiently made, and the results promptly reported."

It can hardly be denied that, from a cavalry point of view, the manœuvres were somewhat disappointing, the lack of enterprise and independence referred to by the Commander-in-Chief in his report, being specially felt. At the same time, there are two sides to every question, and no doubt good reasons could be assigned for all that was done, or left undone, in any particular instance. It is by discussing such questions, in the light of events as they actually occurred, that we may all learn useful lessons for our guidance in the future.

Colonel BURN-MURDOCH (Royal Dragoons):—I fear that the lecturer was slightly in error in saying that a service squadron is supposed to contain none but trained men. I only wish we could reach that ideal condition. The difficulty of

this may be easily seen by the number of horses we have in the squadrons. Each service squadron contains 136 horses all trained. The reserve squadron contains 48 horses, and amongst these 48 horses are the percentage of remounts which we get throughout the year. The total strength of a cavalry regiment on the highest establishment is 670, that is to say, that with men of seven years' service, taking it that they all stay their correct time, we have an annual waste of 96. This does not include men who go from sickness, who purchase their discharge, etc., etc. We may take the whole wastage of a cavalry regiment at 150 to 170 per annum. Thus the reserve squadron would have to train 150 to 170 men with certainly under 40 horses. Therefore it will be seen that it is quite impossible to send nothing but trained soldiers to the service squadrons. My small experience on service is that, however much the squadron leaders may grumble at being short of men in peace-time, they grumble far more at being short of horses when they have been a fortnight on service. I am sure commanding officers will agree with the lecturer when he speaks of giving extra forage to the horses before manœuvres in order to get them fit. Those who have had anything to do with hunters or racehorses must appreciate the advantage of having an animal fit for whatever purpose he may be required. With regard to the machine-made shoes, I think it is well known that machine-made shoes can be made to meet any one requirement, but not for work on different grounds. For instance, I am told that the machine-made shoes in the London Tramway Company last for six weeks. When you get sandy roads, with damp, it is impossible to make the same shoes that are used with the London tramways horses last three weeks. I think the lecturer's argument with regard to trumpet-sounds seems to carry out my view, which is, that the longer it is deferred the better. To my mind, the trumpet-sound should not be used until the manœuvring phase is over. I regret that I was absent from the manœuvres myself, and that therefore, although I have listened with the very greatest interest to what the lecturer has said, I have no remarks to make upon that subject.

The CHAIRMAN (Lieut.-General Sir F. W. J. Fitz-Wygram, Bart., M.P.):—I do hope that this very interesting lecture wi l not be allowed to pass without discussion, because whether the views expressed are correct or not, it is better to have a discussion about them. But as nobody seems inclined to get up, I have to make some remarks myself on points which I have noted in the course of the reading of the paper. It was stated that it is now an order that no horses shall be taken to manœuvres under six years of age. My own impression is that horses five years old, if they are properly fed, are perfectly fit to undertake any work that horses are likely to be wanted for in home manœuvres. It is perfectly certain that you could never get a large number of horses six years old supplied in case of war. As to forage, I quite agree with what the lecturer said. Horses when they are doing a hard day's work do not consume any large quantity of food, and it is a mistake to give it to them. I dare say most of you who have gone hunting will tell me that after a day's hunt a horse feeds scarcely at all. A careful horsemaster will reserve the food for the next day: and I quite think officers would do well if they reserved out of the full ration some of the forage for the next day when the horses are not at work. With regard to the question of shoes, it seems to me, in a great mechanical country like this, it is a scandal that we cannot get iron or other material to stand wear. I think the War Department should set up a standard which they should require the iron to come up to, not actually by putting it on the horses' feet, but by some process of testing by machinery. I do not think there would be any difficulty about that. A good many years ago, at the time of the Egyptian Campaign, we had no cold shoeing, and consequently there was a large store of shoes at Woolwich, all of which were worth absolutely nothing because they were never tested. I then made the suggestion that of all the supplies at Woolwich, a few sets should be actually put on the horses' feet so as to see that proper metal was used. I think that such trial is very essential. It is an astounding statement that I have just heard that at

the end of a fortnight the horses had worn out their shoes. A remark was made about fullering. Fullering, of course, weakens the shoe. As far as I am aware it is not of the slightest advantage or use in the world. As to saddling, the question as to whether a saddle ought to be tight or ought to be loose I dare say will give rise to a good deal of discussion. My own impression is that a mean between the two is what you want. If you put a saddle on very tight you will do mischief, and if you put it on very loose you will do mischief, but there is a common-sense tightness, I think. The real test of saddles is not what they will do in one day, but what they will do carried on day after day. If you are on the march, and march day after day, you will very frequently find a regiment that has had no sore backs in barracks, because the pressure for one day does not create any lump; but if the march is continued the next day, and a third, and a fourth, the result may be very different. I do not think any test of a saddle is of any good at all unless it is used day after day for a week or a fortnight. With regard to hand-signalling, I have never seen it myself used except years ago at Aldershot; but it seems to me that it is a very dangerous thing to trust to it, because you may have a fog, or dust, or a hundred other things. Many other occasions occur on which you cannot see, but the trumpet-sounds can be heard. There are a great many places where you are rather behind a hill or coppice, and when you want to give the order you must do it by sound, as you cannot see. I should think hand-signalling would be a very dangerous thing to trust to. I must say that I cannot exactly believe in it. Then there is the question as to where the leader of the brigade ought to be. My own very strong opinion is that the place for the officer commanding the brigade is, not in front of the front line, but in front of the interval of the second line. The first attack can be ordered and then goes straight ahead; but the brigadier should be in such a position as to be able to manœuvre the second and third lines. If he goes in front, and takes the charge himself, he resigns his command. The second line and third line have lost their brigadier. I believe it has been generally found in cavalry actions that two or three charges take place, one after another, and the result rests on the successful manœuvring of the second and third lines. There was a good deal of divisional drill, I believe, in the manœuvres. It might well enough be practised in peace-time, but I believe it is perfectly useless in war at the present day. I believe the largest force of cavalry that can be handled by one man is a brigade, *i.e.*, three regiments. If you have a division it takes so long to bring it up that the men would be half decimated before you could bring the division into action. I believe the brigade is the largest force that can be used, and personally I should be very glad to see no drill except for a brigade, each brigade manœuvring and carrying on its work according to the intentions of the commander or the divisional officer. With regard to the question of the Royal Artillery, I did not quite gather from the lecturer what was the position.

Major MORRISON:—The position assigned appeared, Sir, to be a brigade in column, massed on either flank, and the guns in line with the leading regiments of those brigades, and in the centre one or two batteries. In the advance the two brigades would advance on either flank of the guns, the guns being placed in the centre with no cavalry.

The CHAIRMAN:—I should have thought myself, that the better place would have been on each flank, where they would have been perfectly free to move any way, and fire at once. I suppose, however, it was tested at the manœuvres, and perhaps I am wrong. I have not been on the ground or seen it at all, but it seems to me from all I have heard that very small results were obtained from the very large force employed. It seems to me that the system of sending out special orders every night must hamper the troops almost as much as the ordinary sham fight. The fact is, it was a field day and not a campaign. If no one else will speak, I shall propose a very hearty vote of thanks to the lecturer for the trouble he has taken in preparing his paper. He has raised a good many points, which may be well considered by you and me and other people afterwards.

MAIN FEATURES OF THE SPANISH-AMERICAN WAR.

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WHILE the events of the war lately ended show nothing which might lead to a radical revolution of present ideas as to rational warfare and the use of modern war material, and while no essentially new appliances have been made use of which might cause us to anticipate a change in the floating material or the weapons of the sea Powers, still the war has enriched former experiences. But, on the other hand, it might lead to erroneous conclusions, as many good devices did not have a chance to be tested, the weakness of the adversary making them superfluous, and others not good did not have bad results, because they were counterbalanced by the defects and mistakes on the part of the enemy or by other favourable circumstances.

The following is a discussion of the points which are of special interest to the naval officer:—

I.—BATTLES OF THE FLEET.

Aside from the moral qualities of the *personnel*, which constitute the prerequisite of success, there are five main factors on which the result of a battle depends: the construction and equipment of the ships, the artillery, the torpedo, the ram, and speed.

The torpedo and the ram were not used in the late war, for the reason that the hostile ships never came close enough to each other. It is claimed, it is true, that two Spanish torpedo-boats attempted an attack at Cavite on May 1st. But these two vessels were so entirely covered by the rapid-fire artillery of the "Olympia," even at a distance of 2,000 metres, that they could only save their crews by running ashore as fast as possible. It is doubtful whether they were really torpedo-boats. If so, the attack could only have been made owing to entire inexperience with torpedo-boat attacks and complete ignorance of modern rapid-fire guns.

The other two factors, artillery and speed, proved to be of much more essential and indeed of a very powerful effect. The superiority of the American artillery as to number, calibre, and kind of guns is well known. The general opinion is also that the shooting of the Americans was very good, while that of the Spanish was miserable.

This was the more essential for the Americans at Cavite, owing to the fact that a large number of their shells did not explode. If nevertheless they achieved such a complete success and caused such destructive fires, it was because of the comparatively large number of hits; there were still quite a considerable number of shells that did explode. Even as early as at the bombardment of San Juan it was discovered that many of the shells did not explode; but this fact was most noticeable at the naval battle of Cavite. It is true that at the end of the battle all the Spanish vessels were under water to the upper deck, so that the really mortal injuries could not be verified; the parts above water showed a number of hits, and there is no reason for the assumption that the ratio of exploded shells to that of unexploded ones was essentially different in the lower parts.

The "Reina Cristina" showed ten shots that had gone entirely through the vessel; the after funnel had been torn down by the falling of the mainmast; no explosive effect could be noticed. However, the whole ship had been burned out, which made accurate observation difficult.

The "Castilla" showed considerable explosive effects. The funnels and metal bulkheads of the upper deck were pierced in different places by fragments and splinters. The conning bridge and superstructure deck were completely destroyed and torn down.

On the "Don Antonio de Ulloa" the masts were pierced in several places; a 5·7-centimetre shot had gone clear through a 12-centimetre gun shield; the chart-house and the starboard side aft showed two hits each, in which there had been failure to explode.

The "Don Juan de Austria" was burned out; effects of firing could not be observed.

On the "Marquis del Duero" the tube of the 12-centimetre starboard gun was bent upward; the cause of this could not be ascertained. Two shots had pierced the ship's side. The upper edge of the funnel had been indented by a projectile. No splinter effects were noticeable.

On the "General Lezo" the demolition of the funnel was apparently due to an explosion.

The "Isla de Cuba" showed no injuries.

On the "Isla de Luzon" the 12-centimetre forward gun, with its whole pivot and shield, had fallen over backward in firing. Two shots (presumably 4-centimetre) had gone through the bow; one of the masts had been grazed by a small-calibre shot. The engine telegraph and superstructures had been demolished; the helm upturned by splinters.

On the "Argos" nothing could be observed.

The "Velasco" had the foremast pierced and slightly burned, the mainmast torn down, and the anchor stock shot off.

When the American fleet advanced for the attack it was fired upon by a battery at Manila. The "Olympia" answered with two shots; both shells were afterwards found unexploded near Luneta. The governor's house at Cavite also showed a shot without explosive effect.

In this respect better results appear to have been achieved at Santiago. This may be gathered from the details known, although the reports refer only in a few instances to the explosive effects attained; but even here a number of cases of non-explosion were noticed on the Spanish ships, as well as the fortifications.

The following table gives some *data* concerning the hits in the naval battle of Santiago:—

American Guns.

—	American designation.							Total.
	1-pounder.	6-pounder.	4-inch	5-inch	8-inch	12-in.	13-in.	
Calibre in centimetres	3·7	5·7	10	12·7	20	30	33	—
Number of guns on board	22	84	6	12	32	6	8	170
Hits.								
Maria Teresa	1	17	1	4	3	2	—	28
Almirante Oquendo ...	—	46	6	3	7	—	—	62
Vizcaya	—	11	4	6	45	—	—	66
Cristobal Colon ...	—	5	—	2	—	—	—	7
Total	1	79	11	15	55	2	—	163

This is not quite 1 hit per gun, or, leaving out the 1-pounders, which have only a short range of fire, 9 hits to 8 guns.

The "Iowa" is the only ship that has 10-centimtere guns, the "Brooklyn" the only one having 12·7-centimetre guns. These *data* can not lay claim to absolute accuracy, owing to the extent of the destruction. The calibres of the hits also admit of some margin.

Special mention should be made of the following points:—The fallen foremast of the "Maria Teresa" showed 2 hits; 10 hits from 3 ships went into the funnels.

On the "Almirante Oquendo" a 20-centimetre shell went through the forward turret roof, exploding, and killing the whole crew in the turret. If the turret had had no roof the shell would have passed over it.

The superstructures on the deck of the "Vizcaya" had been almost completely destroyed by the end of the battle. Whether the torpedo which lay ready for firing in a bow launching tube was detonated by a hostile projectile could not be definitely established. It has also been said that the forward ammunition magazine had exploded.

A 20-centimetre shell hit the protective shield of the second 14-centimetre gun of the "Maria Teresa," exploded in the rear of it, and killed and mutilated everyone in the vicinity, as did also another shell of the same kind which struck the battery deck aft. Still farther aft two 30-centimetre shells struck so close together that their shot holes merged into one. Explosive fragments from them had torn a hole 4 feet square in the ship on the opposite side (starboard).

The "Cristobal Colon," although having received but seven shots, gave up the game, seeing that there was no possibility of escape, as even the "Oregon" and "Texas" had caught up with her after a three hours' chase.

In no case was an armour belt pierced. The greatest destruction comparatively was wrought by the 5·7-centimetre projectiles, while the efficacy of the 3·7-centimetre projectiles was very small, their range not exceeding 2,000 metres. They are therefore to be done away with, perhaps a little over-hastily, since they were constructed primarily as against torpedo-boats and for use at comparatively short distances.

In connection with the hits, a few figures as to the consumption of ammunition may be of interest, while the total consumption of ammunition has not been ascertained. Smith, a seaman on board the "Iowa," fired 135 aimed shots from a 10-centimetre rapid-fire gun in fifty minutes. During the same period of time two 5·7-centimetre guns of the same ship fired 440 shots. The "Oregon" used in all 1,775 shells, but 1,670 of this number were used for the twenty 5·7-centimetre guns alone (or perhaps only for the ten of one side of the ship), while the four 30-centimetre guns fired 31 shots.

The American material demonstrated not only its efficacy but also its durability, as only four guns were in need of repairs at the end of the war, in all of which projectiles had burst in the bore. This fact, taken in connection with other frequent failures of fuses, shows that the construction of the fuse in America is still far from perfect.

It is well known that the extensive fires on board the Spanish ships were due principally to the fact that the Spanish had not sufficiently considered modern experiences and principles by removing everything combustible from the ships. One circumstance should be mentioned in this connection which has perhaps not been fully appreciated, namely, the danger of wooden decks with pitch in the seams. The danger of these decks was still further increased in the Spanish ships by the circumstance that the planks were not even resting on an iron deck. An iron lining excluding the air and being a conductor of heat naturally decreases the danger of a fire spreading, though it does not obviate it, as the splinters of exploding projectiles pierce the deck, thereby causing draughts of air from below. On the "Maria Teresa," "Almirante Oquendo," and "Vizcaya" the upper decks and all the woodwork were completely burned, other decks partially.

The Americans had avoided all combustible material in the construction and equipment of their ships; and moreover, special orders were given at the beginning of the war that all the ships should be examined and everything combustible that might have been left or accumulated on board through carelessness should be removed. Besides, the Spanish appear to have relied entirely on their steam pumps and water mains for extinguishing fires. When these had been destroyed or injured by hostile projectiles, they had no other means to fall back on. Even the most primitive means for fighting fires, such as fire buckets and tubs filled with water, are indispensable in connection

with our modern fire-extinguishing equipment which is very effective indeed, but also very complicated.

The thick powder smoke sometimes suffocated the Americans and almost blinded them. They sought to remedy this by tying wet cloths over their heads with small holes cut into them for their eyes. Smokeless powder would probably have had still more troublesome effects.

The range-finders, to which the good firing results of the Americans were often attributed in the beginning, were not of much use. Owing to their delicate construction, their usefulness was soon impaired. The distances were then estimated from the height of the masts of the hostile ships.

While the Spanish were inferior in every other respect, they might have averted the whole sad catastrophe of Santiago by preserving and taking advantage of their greater speed, which they had shown, at least, at the trial trips of their ships. In this respect the Americans were at a great disadvantage from the outset.

The speed of the two armoured cruisers "New York" and "Brooklyn" was superior by 1 knot to that of the Spanish cruisers, but these were the only ones; the speed of all the other vessels was inferior by from 2½ to 5 miles. The American ships, aside from previous services required of them—the "Oregon," for instance, had not reached Key West on her return from San Francisco until May 26th—had been blockading Santiago for five weeks. Their boilers were in constant use and could not be properly cleaned; the bottoms of the ships were badly fouled. It is claimed that in order to make 11 knots an hour the ships had to use as much coal as they required to make 16 knots, when in good condition, and even then they could not attain their original speed. The Spanish, on the other hand, had a good opportunity during their six weeks' stay in Santiago Harbour to put their boilers and engines in first-class condition and to clean the bottoms of the ships.

Here, again, the moral qualities of the *personnel* are of the greatest importance. Technical perfection is but an auxiliary in warfare—a 0 which acquires value only by the figure placed before it, namely, the mental qualities of the warrior. It is doubtful, however, whether the Spanish ships ever actually possessed the speed officially claimed for them. At trial trips it is easy enough to use means by which the efficiency attained appears greater on paper than it is in reality, especially if the *personnel* accepting the ship is not of the highest moral and technical standing. In any event, the Spanish engine *personnel* was not equal to its task.

It did not need this war to establish the value of an efficient engine *personnel* for success in war; but the immensity of the catastrophes must make it plain even to the most superficial mind that it would be very wrong to deny the importance of the services of the men who give life and motion to the ship by the most arduous kind of work simply because they do not handle shell and lanyard, but coal shovel and fire hook. The very best of human material, strong in body and mind, is the only kind suitable for this work, and a Navy should spare neither trouble nor expense to secure it.

On the subject of the efficiency of monitors, opinions in United States naval circles were much divided at the beginning of the war. The United States are the only ones who still continue to build this type of ship. Little was heard of their services during the war. Two of them went from San Francisco to the Philippines, the greater part of the way in tow of their colliers. The "Monterey," accompanied by the collier "Brutus," left San Diego, Cal., on June 11th and arrived at Manila on August 4th. The distance is 7,600 miles, 3,725 miles of which she was towed. Twice she had to touch at anchoring places, namely, at Hawaii and Guam. She was towed, from the 8th to the 23rd of June, 712 miles; from the 5th to the 22nd of July, 2,541 miles, and from the 25th to the 28th of July, 472 miles; average speed while in tow, 6·76 knots. The weather was fine during the whole time, with the exception of a slight storm on July 31st. The voyage took in all two months less seven days. The "Monadnock" took exactly the same length of time, having left San Francisco on June 23rd and arrived at Manila on August 16th.

These voyages are quite remarkable as far as sea efficiency is concerned, but when it comes to war efficiency they had better not be relied upon. The confidence in the efficiency of the monitor for war purposes has been considerably shaken. Captain Mahan, who used to argue in favour of a defensive Navy composed of monitors, has recently expressed the opinion that the inefficiency of the monitors had now been proved; that they had been a constant impediment to the fleet owing to their lack of speed, limited coal capacity, and unstable platforms, which completely excluded effective firing in a bombardment. For harbour defences also he prefers land fortifications to monitors.

II.—Bombardments.

What might be the results of a serious battle between armourclads and coast forts the war did not demonstrate. The Americans in these instances never went close enough to make it possible to note decisive results on either side of the belligerents. They should not be blamed for this. If they could obtain their object without taking greater risks, it would have been a mistake to take such risks, and they certainly did attain their object. The great injuries, however, which the Americans claimed to have inflicted at different times have subsequently proved to be exaggerations and delusions. Even at target practice we believe only reluctantly the statements of "too short" or "too far" made by an observer favourably stationed. The claims that the forts had been silenced, which would presuppose that the guns had been dismounted, were also founded on delusion.

There is no doubt that the Americans had better guns than the Spanish in their land batteries and could fire at distances which the Spanish guns could not reach. When this was recognised ashore and the firing stopped, the ships thought they had silenced the batteries. It has therefore been demonstrated that the ships were unable to seriously injure the land fortifications at great distances. After all the bombardments of Santiago there was but one gun dismounted in each of the

batteries at the Morro and the Socapa. It has not been demonstrated whether with equal armaments and skill in firing on the part of the Spanish the ships would not have seriously suffered. Still less has it been demonstrated what the relative situation of the belligerent parties would have been if shorter distances had been chosen.

The employment of torpedo-boats for bombardments, as at Cardenas, must be designated as entirely unsuitable. Torpedo-boats are expensive and delicate vessels, equipped for launching torpedoes and for great speed. Their guns are intended to be used only in extreme cases. When the torpedo weapons can not be used their other principal quality, speed, in connection with the circumstance that they draw little water, may be utilised for the transmission of orders and information ; but bombardments, even in narrow and shallow waters, had better be left to the most primitive gun-boats, etc. ; they can do better work and are less expensive, but can never take the place of a disabled torpedo-boat.

The so-called dynamite cruiser, "Vesuvius," was a failure. Her projectiles can be fired only at medium and short distances, and can not be aimed. The terrible effects claimed for hits can not be considered as counterbalancing this. It is true that an accidental hit may cause great havoc, but in this age of accurate firearms we should no longer reckon with such uncertain factors. The Americans have utilised the vessel accordingly. They used to send her at night against the coast defences, counting on accidental hits, while the vessel, protected by the darkness, did not betray her presence by any flash at the discharge nor by smoke or detonation. Nothing has been heard of any particular result. No attempt was made to carry out the idea, so much talked of at first, of destroying the mine obstructions by systematic bombardments of the harbour entrance. In order to do this it would have been necessary for the vessel to approach the shore in daytime, when she would have been exposed to the very dangerous fire of the coast forts, and a systematic bombardment could hardly be spoken of in view of the uncertainty of fire.

The Americans consider this vessel a failure, as also the ram "Katahdin," which, aside from four rapid-fire guns, has no other weapons but her ram.

III.—Coast Defence.

Some obstructions by means of vessels and mines were laid out by both belligerents, but did not come into play. The Spanish had attempted to close the entrance of San Juan Harbour in Porto Rico and that of the Pasig River at Manila by sunken vessels. In the latter case it was the opinion of German officers that it did not constitute a military obstruction, although it interfered considerably with the movements of shipping.

The two mines which were blown up in front of the "Olympia" at the beginning of the battle of Cavite were not intended as a regular obstruction of the channel, but represented only a small mine-field for vessels that might accidentally pass over them. They were fired prematurely.

In the entrance of Guantanamo Bay the Americans found quite a number of mines. These might have caused considerable damage if they had operated, for the Americans entered the bay without any precautionary measures, and the screws of the "Marblehead" tore two of the mines loose from their anchorages so that they rose to the surface of the water. Then the whole bay was systematically searched for mines. This was done on June 21st by the boats of the "Marblehead" and "Newark." Four steam launches, under the fire of Spanish infantry hiding on the shore, fished up thirteen mines on the first day with light chains they were towing. The ships, of course, fired on the hostile position, which was soon abandoned. During the next few days thirty-five more mines were found and taken ashore. These proved to be charged with 120 lbs. of guncotton each. Many of them showed evidences of having been in contact with ships' bottoms or screws, but the firing mechanism was not capable of operating. The fuses showed such grave defects that it was quite evident that the work of constructing them had not been done under the supervision of an expert.

The mines raised in Santiago Harbour after the surrender of the place proved on the whole to be in better condition. Still, the outer row consisting of contact mines was of doubtful value. One mine was found, for instance, in which half of the guncotton had been burned, leaving no doubt that it had been in contact with some object—probably the "Merrimac"—and that the fuse had acted, but that the guncotton charge had become spoiled.

The second row of mines (electric) was in pretty good condition and might easily have destroyed one or more ships if an attempt had been made to force the entrance. These latter mines contained a charge of 200 lbs. of guncotton each. All the mines in Guantanamo as well as Santiago Bay were thickly overgrown with barnacles and seaweeds.

As a curiosity, it may be mentioned that during the Civil War lightning struck an American mine in the lower Mississippi and exploded it, and that several mines in the Potomac were exploded by lightning at a few seconds' interval without causing any disturbance in the rest of the mine system. They blew up exactly as it was intended they should be blown up in war.

IV.—Blockades and Cruiser Warfare.

Both of these were applied by the belligerents in the mildest possible form. Spain can hardly be considered in this connection. She could do no blockading, and it is somewhat doubtful whether it was quite voluntarily that she abstained from capturing hostile merchantmen. The Americans were enabled to maintain quite an effective blockade on the coasts, which they designated as blockaded, by means of a large number of yachts and other steamers which they had incorporated into their Navy as auxiliary vessels, while their large ships were giving their attention to the hostile naval forces.

It can hardly be said that the Americans carried on systematically any destructive warfare as against Spanish merchantmen. Those they did capture almost ran into their hands, so to speak. This was especially the

case at the beginning of the war, mostly with vessels which, owing to the usual Spanish carelessness, had received no warning of the fact that hostilities were about to break out. This was even the case with the Spanish gun-boat "Callao" in the Philippines. Still a few prizes may be mentioned which were captured while making a direct attempt to run the blockade, also a few cases where vessels were chased till they ran ashore, while a few fast Spanish vessels succeeded in running the blockade. But neither the successful nor the unsuccessful attempts at running the blockade were of much importance.

A number of neutral vessels were also captured, but nearly all of them were released again, for the American Government, in adjudicating their cases, showed a liberality which was quite unheard of in former naval wars and which probably had a political background. About thirty vessels in all were considered good prizes.

As the United States as well as Spain have refrained from privateering, although they were the very countries which reserved that right at the time of the Paris Declaration, it may be assumed that privateering is definitely at an end.

During the blockade of Santiago the harbour entrance was at night kept constantly under the light of the projector of some ship designated for the duty, and boats were stationed at intervals between the other vessels and the shore, so that any attempt of the Spanish ships to go out might at once be perceived. It has been commented upon that the ship so illuminating the harbour entrance was hardly ever fired upon by the fortification works. It would seem as though telegraphically connected observation stations at the Morro and Socapa could have ascertained the exact distance of the troublesome watcher and made her work, if not entirely impossible, yet extremely difficult by firing upon her.

V.—Landings.

The landing of the Americans at Daiquiri is the largest landing effected since that of the Western Powers at Balaclava in the Crimean campaign. Yet the total forces landed did not exceed 15,000 men, embarked in fifty-three steamers. It took a long time before the troops were ready to start, for everything required for an army and a landing had first to be procured. When the expedition finally did start it was found that a great deal had been overlooked or was incomplete, or had been lost in the chaos, or could not be secured. For instance, no cavalry horses—except for one troop—could be taken along because there had not been time to fit out the vessels for the reception of horses. The voyage and the landing were effected in the most beautiful weather; the Americans had good luck, as they always did. The forces were landed unmolested.

The disembarkation was effected almost entirely at a small landing bridge where but two boats could go alongside at a time. Attempts to have boats run ashore on the small sandy beach, at one end of which was the bridge, had to be abandoned after the loss of several boats, which were wrecked in the surf on the projecting rocks and stones. The report that the United States war-ships had first fired on the open strip of land

back of the landing place and routed the Spanish should not be taken literally. No such open strip of land exists there. The rocks reach close to the sea, offering hundreds of sheltered places from which the bridge might have been fired upon. Authorities in military matters state that 300 men, though they might not have been able to prevent the landing entirely, could have caused great losses. But on this occasion, as on so many others, the Spanish showed that they had no appreciation of military situations, and as soon as the bombardment commenced they retreated. They need not have paid much attention to the Cubans. The Spanish ought to have known that now that the Americans had arrived the Cubans would avoid danger even more than before.

With the landing of the army all operations on the part of the Americans ceased for a while. In spite of the most exhaustive use of all the boats and auxiliaries of the war-ships, including the armourclads guarding the entrance to Santiago Harbour, it took several days before the field guns and luggage could be brought ashore, to say nothing of the siege guns. It was found that there ought to have been many more lighters, especially such as are equipped with lifting apparatus. There was only one of these—a second one had disappeared during the voyage. There were no devices for landing horses and mules which were intended for drawing the guns. The animals were hoisted overboard, and it was taken for granted that they would swim ashore. But in a number of instances this did not happen. Many of the frightened and bewildered animals swam out to sea and were drowned. As all the boats were being used in the landing and were crowding each other for hours at the landing place, there was none available to go after the mules and lead them in the right direction. The few men in charge of landing the animals had all they could do to get those that swam ashore out of the surf and in safety. About 50 animals perished.

There was lack of management generally. No one in authority had been appointed commander of the landing place. The commander-in-chief, General Shafter, did not trouble himself about the landing. Admiral Sampson had only made arrangements as far as the war-ships and their boats were concerned. The only landing bridge was but partly covered with loose boards. No material or tools were at hand to build other bridges, and little attention was given to the one bridge in existence, as is evidenced by the fact that three weeks later the loose boards were still loose.

The conditions at Siboney, where part of the troops and supplies were landed a little later, were quite similar, except that there was no bridge at all. But in calm weather a few boats could run ashore side by side. No bridge was built here for the landing of the voluminous luggage.

The relations between the military authorities and the officers of the transport steamers had not been regulated. The latter had only their own advantage and that of the ships' owners in view, and did not pay the least attention to the wishes and plans of the officers of the troops. The greater part of the time they kept at a distance of from 3 to 20 miles from

the shore, to make sure not to go too near or to get into collision with other vessels; and if at times they did assist in unloading their cargoes, they would return to the sea as fast as possible as soon as fire was opened ashore, often taking with them the most indispensable articles of the army equipment. An American reporter even calls them insolent, un-American, mutinous cowards. The army authorities were unprepared and powerless before such conduct on the part of the officers of the transports. Under these circumstances it is not strange that the landing of the provisions, guns, and ammunition, and the entire equipment, all of which were so much needed in this locality, which offered no resources, was effected with such slowness that the troops were reduced from the outset to the meagre rations which each man carried with him; and where these had been thrown away, as had been done in many instances in order to lighten the weight, the soldiers suffered hunger.

VI.—Coaling.

The late war will give a new impulse to the important question of supplying coal. Ships and fleets carrying on war in a region where they do not have available bases of supplies and coal depôts in their immediate vicinity, or whenever they are not certain that there may not be occasion for their having to leave such region temporarily, should have their own colliers with them. The colliers should have the same speed as the squadron. The ships should not be compelled to rely on rendezvous or the uncertainty of colliers sent after them. But not only should care be taken to have a sufficient supply of coal, but also to provide appliances for taking coal on board under all circumstances in the shortest possible time. The lack of such appliances has contributed not a little to the disasters of the Spanish. The coaling of Admiral Camara's ships at Port Said was nothing but a comedy. Admiral Cervera intended to coal rapidly at Santiago and proceed. But the appliances for that purpose proved so defective that the United States fleet had shut him up in the harbour before he could finish coaling, which operation took several days. At present not many ships are being built with that end in view, nor are they being equipped with appliances for coaling in the shortest possible time. This will be absolutely necessary in future, so that the ships may be enabled to take on board coal or other fuel either from a wharf or from a lighter or collier at sea.

VII.—Auxiliary War-Ships.

What could be done with money and a practical mind in the matter of securing naval war material the Americans did when the war cloud appeared on the horizon. It is true that the purchase of foreign war-ships before the beginning of the war proved almost a failure. The United States bought the following Brazilian war-ships:—The protected cruiser "Amazonas," of 3,450 tons, afterwards called the "New Orleans"; the protected cruiser "Almirante Abreu," same size, afterwards called the "Albany," and the cruiser "Nictheroy," 7,080 tons, afterwards called the

"Buffalo," which, apart from her good rapid-fire armament, had a 38-centimetre dynamite gun; from other sources the cruiser "Diogenes," of 1,800 tons, renamed the "Topeka," and a torpedo-boat purchased in Germany, called the "Somers." The only ones of these that were assigned to the active fleet were the "Topeka" and the "New Orleans." The "Albany" and the torpedo-boat "Somers," which were still in England after the breaking out of the war, were not allowed to leave there on account of England's neutrality. The "Buffalo" did not leave the navy yard during the war. The United States had better luck with the merchant steamers they purchased and converted into auxiliary cruisers and gun-boats.

They bought 60 yachts and other steamers as auxiliary gun-boats and scouts, 4 large fast ocean steamers as auxiliary cruisers, 11 tugs, subsequently armed. The following were chartered: 4 large ocean steamers as auxiliary cruisers. Placed in commission: 14 revenue cutters as auxiliary gun-boats and scouts. In all, 93 steamers for warlike actions, more or less armed and fitted out for that purpose.

There were also purchased as adjuncts of the fleet 20 transport-vessels, 9 colliers, 1 repairing-ship, 2 water-distilling ships, 2 ice-manufacturing ships, 3 hospital-ships; in all, 37. This does not include the temporarily chartered steamers for the larger troop transports.

The large auxiliary cruisers were also occasionally utilised for the rapid transportation of troops. The auxiliary gun-boats were indispensable for the blockade of the extensive stretch of the coast. The names of several of these, even of tugs, were specially mentioned in several of the battles. A few of the auxiliary vessels, as, for instance, the "St. Louis" and the "Zafiro," were equipped with special devices for dragging for cables, which they used with good success.

As for the adjuncts of the fleet, the distilling-ships were intended especially to furnish fresh water to the blockading auxiliary vessels and the transports of the landing army. As most of these vessels had inadequate distilling apparatus, some of them none at all, this was necessary, so that they might not be compelled to leave the blockade for the purpose of renewing their water supply. The repairing-ship "Vulcan" was also equipped with a powerful distilling apparatus.

The ice-manufacturing ships supplied the vessels not equipped with ice machines, also the hospitals of the invading army of Cuba. The object of the other adjuncts of the fleet is self-evident.

The repairing-ship "Vulcan" has proved extremely useful even indispensable for the blockading fleet at Santiago. She supplied 31 vessels with extra engine parts, material, and tools. Twenty-six vessels were repaired, and a number of repairs were also made on guns and their equipments. The "Vulcan" also rendered important services in connection with the raising of the "Maria Teresa."

How important it is to own transports specially fitted out for the transportation of troops and war material was demonstrated in this war, though principally by the lack of vessels equipped for such service. Of the transports purchased during the war, the Navy Department has

retained 16, which are to be refitted for service as regular marine transports, namely, the "Panama," "Port Victor," "Rita," "Mohawk," "Mobue," "Massachusetts," "Manitoba," "Minnewaska," "Mississippi," "Michigan," "Roumania," "Obdam," "Berlin," "Chester," and "Britannia," employed on the Atlantic Ocean, and one on the Pacific coast. During the war they were used not only for the transportation of troops, but also for supplying provisions and material.

It would have been very desirable to have had even more of these. The blockading fleet, for instance, complained of the very defective mail service, as also of the fact that, although it was comparatively but a short distance to the United States ports, so few fresh provisions were received, which circumstance impaired the health of the troops.

Vessels built for special purposes are in times of peace, at manœuvres, stepchildren of the Navy; they are considered expensive and troublesome adjuncts which have to be taken into consideration in manœuvres and impede their rapid execution; and yet how useful they are and how much relief they are able to furnish in actual war! Whenever mobilisations show that there is not a sufficient number of suitable merchant steamers which would be unquestionably at the disposal of the Navy at the beginning of a war, provision should be made to have vessels set apart which can be easily equipped for such purposes, and, if necessary, to own and keep in constant readiness a number of such special vessels even in time of peace.

THE BRITISH MARSHALATE, 1805–1855.

By CHARLES DALTON, Esq.,

Editor of "English Army List and Commission Registers, 1661-1714."

THE coveted *bâton* was bestowed nineteen times within the space of fifty years. The fortunate recipients included four princes of the blood royal of England; two foreign princes who were closely allied to the British Crown by marriage; one European sovereign who had been the ally of Great Britain in two sanguinary campaigns; two commanders-in-chief of the British forces on the Continent; one general who had been governor-general of India; three generals who had held the high post of commander-in-chief in India; one general who had commanded the British and Hanoverian cavalry in one of the decisive battles of Europe; two generals who had reached the patriarchal age of ninety when appointed field-marshals; and three who were aged respectively eighty-three, eighty-one, and seventy-eight years when similarly honoured.

When it is remembered that the marshalate was introduced into the British Army by George II.[1] no one can feel surprised at five of this monarch's grandsons receiving the *bâton*, for they all had served with credit in the field, and had performed their military duties to the best of their several abilities.

On 5th September, 1805, Edward, Duke of Kent was appointed a field-marshal. In 1794 this prince (then Prince Edward) had served with distinction at the taking of the French West India Islands, and on several occasions his life was exposed to the most imminent peril. It is recorded that when Prince Edward was ordered to storm Morné, Tartisson, and Fort Royal, Martinique, on 17th March, 1794, he placed himself at the head of his brigade of grenadiers and addressed them as follows: "Grenadiers! this is St. Patrick's Day; the English will do their duty in compliment to the Irish, and the Irish in compliment to the Saint! Forward, grenadiers!" After holding the command of all the British forces in North America, H.R.H. was appointed Governor of Gibraltar in 1802. The splendid victory obtained by Wellington (then a marquis) over the French Army at Vittoria, in 1813, resulted in the overthrow of Joseph Bonaparte's power in Spain, and the capture of the enemy's baggage and money chests, the last of which were said to have contained five millions and a half of dollars. "Be this as it may," says a military writer, "the soldiers and camp followers took care that the exact amount

[1] See article on "The British Marshalate prior to 1800," by same writer, in the *United Service Magazine*, April, 1896, p. 18.

should never be fairly ascertained; and when the chests were conveyed to headquarters they were found empty." Among the captured spoils was the *bâton* of the French marshal Jourdan. This trophy was sent to the Prince Regent of England, who wrote a gratifying letter to Lord Wellington, dated from Carlton House, 3rd July, 1813, which contained this passage:—"You have sent me, among the trophies of your unrivalled fame, the staff of a French marshal, and I send you in return that of England." Wellington had previously been appointed marshal-general of the Portuguese Army. This Army had been licked into shape, and taught how to fight, by Sir Wm. Carr Beresford, who was given the rank of marshal in Portugal by the King of that country. Marshal Beresford won a viscount's coronet for his dearly-bought victory over the French at Albuera. Lord Londonderry has left on record how Beresford exposed himself, during the before-named battle, "with a degree of intrepidity which could hardly fail of spreading an example of heroism around, repeatedly dragging the Spanish officers from their ranks, compelling them to lead their men forward and show them the way."[1] But Jack Spaniard was not a man to be seized upon and brutally forced to fight against his will; he preferred to live to fight another day.

The Duke of Wellington is the only instance of a field-marshal of Great Britain being appointed a field-marshal in the Russian Army. Curious to say, Wellington found himself a Russian marshal in common with the famous Michael Bogdanovitch Barclay de Tolly, who commanded one of the three divisions of the Russian Army that effectually checkmated Napoleon in 1812. De Tolly, who had been ennobled for his eminent services, belonged to a family of ancient Scottish lineage which had settled at Riga in the eighteenth century. After his death, the following humorous anecdote appeared in an Edinburgh newspaper:—

"THE LATE RUSSIAN FIELD-MARSHAL BARCLAY DE TOLLI.

"This distinguished warrior, who was of Scottish descent, was no less an ornament to military than civil life. The arduous duties of the soldier never made him forget the milder, but no less imperious, obligations of the man and the Christian. Soon after the memorable campaign of 1812, when the Russian troops were pursuing the flying enemy, the field-marshal, standing one fine morning, earlier than usual, at the window, enjoying a delicious prospect in the city of D———, he overheard the following short dialogue between the sentinel at his door beneath, and a poor discharged invalid soldier:—

"Invalid: Good morrow, comrade. Is his Excellency stirring yet, think you?

"Sentinel: I hardly think he is; but what's your business with him?

"Invalid: I would make bold to hand him this petition.

"Sentinel: Don't you know that we've strict orders not to let anyone in with petitions?

[1] "Narrative of the Peninsular War," by Lieut.-General the Marquis of Londonderry, G.C.B., etc.

"Invalid: I am sure his Excellency would assist me, being personally known to him since the battle on the Beresina. Do let me in; see how the French rascals maimed me—I'm a cripple for life.

"Sentinel: Well, go in; I'll pretend I didn't see you.

"Thus saying, the brave sentinel, wiping a tear out of the corner of his eye, walked up and down on his post, and the invalid hobbled in at the open gate as fast as he could. But how to get an interview with the field-marshal? This puzzled the poor fellow not a little. He had passed the foreposts, it was true, but was still very far from the headquarters. In this dilemma he was half alarmed and half rejoiced to hear the marshal in a thundering voice call out to his orderly to bring up that invalid and the sentinel at his gate. In an instant both stood before the noble warrior—the one confident of relief, the other no less sure of punishment. 'What does this mean,' cried the marshal, addressing the invalid, 'don't you know you have no right to intrude in this manner?' The invalid only answered by casting a pitiful look at his disfigured body, which look seemed to say 'I think I have right enough.' 'And you,' said his Excellency, thundering at the sentinel, 'how dare you act in disobedience of orders?' Erect as a poplar stood the Grenadier, without answering a word. The field-marshal now rung, and his secretary appeared. 'Here,' cried his Excellency, 'give each of these twenty-five in my presence.' The secretary stared, and at last ventured to stammer out the words, 'shall I call the corporal?' 'No,' resumed the marshal, 'do it yourself.' Disobedience being a word almost unknown in the military language of Russia, the astonished secretary began to look round for some weapon or instrument wherewith to inflict the punishment; but seeing nothing, he ventured to ask, 'With what?' 'With what? Why with your hands,' replied the marshal. 'I thought you knew Barclay better—give each of them twenty-five roubles, the sentinel for his humanity; the invalid for his bravery and sufferings."

Retracing our steps to the year 1813, we find that on 26th November, Ernest, Duke of Cumberland (afterwards King of Hanover) and Adolphus, Duke of Cambridge were appointed field-marshals. The former had begun his military career in the Hanoverian cavalry and saw much active service in Holland, where he commanded a cavalry brigade. In an encounter with the French, near Tournay, in the campaign of 1794, he was severely wounded in the arm and lost his left eye. He shared in the sortie from Nimeguen and subsequently commanded the rear guard of the British Army in the retreat through Holland. Towards the close of the great war, Cumberland was attached to the Prussian Army and was present at the battle of Leipsic. On another occasion he witnessed the death of General Moreau—Napoleon's *bête-noire*. For many years Cumberland held the colonelcy of the Blues. The Duke of Cambridge was appointed an ensign in the British Army at the age of sixteen. Thirteen years later (1803) he was sent at the head of 8,000 Germans and 6,000 English to defend the Electoral Dominions of his father. He then held the rank of lieut.-general in the British Army. On arriving at Hanover he found that the interest of his family was at an end and nothing would suit the

people but a commander of pure Hanoverian blood. This desirable leader was found in the person of Count Walmoden, and the Duke of Cambridge returned to England. Soon after this event Walmoden was forced to capitulate to the French. After the expulsion of the enemy from Hanover the Duke of Cambridge returned thither as viceroy, and remained till 1837, when his brother Ernest succeeded to that kingdom as eldest male representative of the House of Guelph.

On the 24th May, 1816, William, Duke of Gloucester, and Leopold, Duke of Saxe-Coburg, were appointed field-marshals. The former had received a commission as captain in the 3rd Foot Guards in 1789 with the rank of colonel in the Army. He saw active service in Flanders under the Duke of York and in 1806 was appointed colonel of the 3rd Foot Guards, which post he retained until his death in 1834. The Duke of Saxe-Coburg received his *bâton* as husband of Princess Charlotte of Wales. This prince had a splendid record of war service. Entering the Russian Army in 1803 he rose to be a major-general of cavalry in that Service. For a short time he was attached to the Prussian Army. He fought at Lutzen and Bautzen and in the last hard-fought battle he covered the retreat with the cavalry under his command. At Leipsic he played a conspicuous part and in the campaign of 1814 against Napoleon again distinguished himself. The Emperor of Russia bestowed the Cross of St. George on the Duke of Saxe-Coburg. On 2nd May, 1816, he was appointed a full general in the British Army and given the colonelcy of the 5th Dragoon Guards, which he retained until 1831, when he ascended the throne of Belgium as Leopold I.

At the coronation of George IV. (19th July, 1821) the two senior generals of the British Army were raised to the marshalate, viz., Charles, Marquis of Drogheda, K.P., and William, Earl Harcourt, K.C.B. Lord Drogheda was the oldest old gentleman in the Army and had attained the patriarchal age of ninety-one. He was the sole surviving officer who had fought at Culloden, in which sanguinary engagement he is said to have carried a pair of colours.[1] His baptism of fire was certainly a rough experience of war for a lad barely sixteen. Whether he had a surfeit of slaughter on Culloden Moor, or whether his parents wished him to follow a less dangerous career, does not appear, but the military profession knew young Moore no more until 18th November, 1755, when he was appointed lieut.-colonel of the 1st Regiment of Horse in Ireland (now 4th Dragoon Guards), and on 7th December, 1759, lieut.-colonel commanding 19th Light Dragoons. He saw no more war service, but won a marquis's coronet as a political campaigner. At the time of his death (22nd December, 1822) he was colonel of the 18th Dragoons. Earl Harcourt began his eventful career as an ensign in the 1st Foot Guards in August, 1759, and was appointed captain in the 16th Light Dragoons in October of the same year. He served as A.D.C.

[1] "Military Calendar," Vol. I., p. 280 (1820 edition). The memoir of Lord Drogheda in the "Dictionary of National Biography" makes no mention of Drogheda having served at Culloden, 16th April, 1746, but the "Military Calendar" is a better authority.

to the Earl of Albemarle at the taking of Havanna. In 1776 he proceeded to America as lieut.-colonel of the 16th Light Dragoons, and had the good fortune, when scouting near the Delaware with 30 dragoons, to surprise and capture in his camp the American general, Charles Lee, who was accounted Washington's ablest officer. For this service Harcourt received the thanks of Parliament, was made A.D.C. to George III. and soon after succeeded General Burgoyne as colonel of the 16th Light Dragoons, which subsequently was known as "Harcourt's Black Horse." He commanded the British forces during their retreat through Holland in the winter of 1794-5.

Following the example of his brother, William IV. appointed the two senior generals of the Army to the marshalate at his coronation. Sir Alfred Clarke, G.C.B., and the Right Hon. Sir Samuel Hulse, K.C.B., were the fortunate veterans. Sir A. Clarke joined the Army as an ensign in the 50th Foot in 1759, and served under Lord Granby in Germany during the latter part of the Seven Years' War. After serving fifteen years on the staff in Canada, without returning to England during this long spell of employment, Clarke served as commander of the land forces at the capture of the Cape of Good Hope in 1795, and was commander-in-chief in India from May, 1798, to July, 1801. At his death he held the colonelcy of the Royal Fusiliers. Sir Samuel Hulse was born in 1747, and received an ensigncy in the 1st Foot Guards in 1761. He served under General (afterwards Lord) Lake in Holland, and was present at the brilliant affair of Lincelles. Having been appointed by George III. to the Prince of Wales's suite, Hulse's active military career terminated. He acted as treasurer and receiver-general to the Prince for many years, and on George IV.'s accession was appointed Treasurer of the Household. At the time of his death (1st January, 1837) Hulse was Governor of Chelsea Hospital.

On 8th February, 1840, the Prince Consort was appointed a field-marshal of Great Britain. He was not a soldier, but he materially raised the tone of the Army by being mainly instrumental in obtaining an amendment of the Articles of War, which had for its object the abolition of duelling. In 1850 the Duke of Wellington, who fully recognised the Prince Consort's wonderful power of organisation, mastery of details, and administrative abilities, personally pressed Albert Edward to accept the office of commander-in-chief. The Prince's good judgment prevented him acceding to the request, and at the Duke of Wellington's death, Viscount Hardinge was entrusted, by the Prince's advice, with the command of the Army.

On the 28th July, 1845, a *bâton* was bestowed on William II., King of the Netherlands, as a politic measure. This sovereign fought on our side in the Peninsula and at Waterloo (as hereditary Prince of Orange), and was severely wounded on the 18th June, 1815, after behaving most gallantly. He had held the rank of general in the British Army since 1814.

On the 9th November, 1846, the three senior generals of the Army were promoted to be field-marshals, viz., Sir George Nugent, Bt., K.C.B., Thomas Grosvenor, and the Marquis of Anglesey, K.G., G.C.B., Master-

General of the Ordnance. Sir George Nugent was born in 1757, and received his education at Charterhouse and the Royal Military Academy, Woolwich. Joined the 39th Foot as ensign in 1773. Served subsequently during the American war. Exchanged to the Coldstream Guards in 1790 from the 4th Dragoon Guards. Accompanied the Guards to Holland in 1793, and served at the siege of Valenciennes, the affair of Lincelles, and at Dunkirk, etc. Returning to England he raised the 85th Regiment of Foot, and was appointed colonel. Accompanied his corps to Walcheren with the temporary rank of brigadier-general. Was major-general of the northern district during the whole of the Irish rebellion. From 1801-6 was commander-in-chief in Jamaica, and from March, 1811, to October, 1813, was commander-in-chief in India. He died 11th March, 1849, aged 92. Thomas Grosvenor began his career as an ensign in the 3rd Foot Guards at the age of fifteen and saw a good deal of service with his corps in Holland. Was appointed to the command of the troops that were directed to obtain a landing on the Spanish coast in the attempt upon Cadiz. This expedition, however, was relinquished on account of the dreadful fever then raging in the town of Cadiz. General Grosvenor commanded the pickets and outposts at the siege of Copenhagen, in 1805, on the day of the sortie when the Danes were repulsed in their attempt on the besieging batteries. Served at the siege of Flushing, and was next in command to Sir Eyre Coote. The thanks of Parliament were voted to General Grosvenor on the successful termination of the siege of Copenhagen; as a member of the House of Commons he was present on the occasion and made a brief and modest reply. At the time of his death (20th January, 1851) he was colonel of the 65th Foot. The Marquis of Anglesey was styled the Prince Murat of the British Army. He was *par excellence* a cavalry leader, but was pre-eminently fitted to hold the highest post in any Army. He was equally at home in handling an infantry regiment on the field of battle, in leading a brilliant cavalry charge, or in covering the retreat of an army. He raised and commanded the 80th Foot during the Duke of York's first campaign in Holland. In 1795 Lord Paget, as he then was, obtained the lieut.-colonelcy of the 7th Hussars and again distinguished himself in the fruitless and unfortunate compaign in Holland. But the Peninsula afforded a better field for his genius, and the brilliant cavalry affairs at Sahagun and Benevente testified to Paget's great military ability. In 1812 Lord Paget succeeded his father as Earl of Uxbridge. Of the important part played by Lord Uxbridge at Quatre Bras and Waterloo, it is unnecessary to speak; it is enough to say the success of the British cavalry on the memorable 18th June was in a large measure attributable to Uxbridge's brilliant leadership and example. He was a man of few words, and it is recorded that when he was shot in his right leg at the close of the great battle, he happened to be riding alongside the great Duke. "I'm hit, by G——!" exclaimed Uxbridge. "Are you, by G——?" exclaimed Wellington. This, we are told, is the only conversation that passed between the two great leaders at Waterloo.[1] The loss

[1] *Cornhill Magazine*, December, 1897.

of his leg to one of the best riders of his day must have been a serious drawback in after-life to the Marquis of Anglesey (so created 23rd June, 1815). But the defeat of Napoleon's renowned cavalry at Waterloo more than recompensed the marquis for the loss of a limb. In 1827 Lord Anglesey succeeded the Duke of Wellington as Master-General of the Ordnance. The speech he made at the dinner given to his lordship by the officers of the Royal Regiment of Artillery, on 11th June, 1827, shows his fitness for the post he had then entered on :—

"The gracious favour of his Majesty has selected me to fill the office of Master-General, a post the most enviable, or, if not the most enviable, as much so as the utmost ambition of a soldier can aspire to. The renown which the British Artillery has so nobly acquired throughout Europe, I may say throughout the world, its skill, its science, its gallantry, its order, its discipline, have been quoted, have been talked of, have been the theme and the admiration of every Army and every Court in Europe. I see around me many gallant friends, with whom it was my good fortune to serve in my early military career. I well remember what confidence I felt when on the march I heard the trundling of the cannon wheels. I then served in the infantry—the basis of every arm, the most perfect of all, because it is in itself capable of defence. How much, then, must these impressions have been increased when afterwards serving in the cavalry, I became more conversant with the value of artillery. The cavalry is of itself a feeble arm, comparatively a feeble arm, but with its natural ally, the artillery, it is capable of any achievement."[1]

Seventy years ago the majority of British generals were firm believers in the "cold steel" theory, and artillery had not attained the importance in the British Army which this all-powerful branch of the Service then occupied in foreign Armies. Lord Anglesey's two terms of office as Master-General were highly beneficial to the Royal Artillery.

After the defeat of the Russians at Inkerman, General Lord Raglan, commander-in-chief of the allied forces in the Crimea, was appointed a British field-marshal, and his commission dated from the memorable 5th November, 1854. His early services in the Peninsula and at Waterloo (where he lost his right arm) are too well known to recapitulate, and the same may be said of his command in the Crimea.[2] He is the sole instance of a British field-marshal who died while commanding an army in the field.

On 2nd October, 1855, Viscount Combermere, G.G.B., etc., the Earl of Strafford, G.C.B., etc., and Viscount Hardinge, G.C.B., etc., were appointed field-marshals. Lord Combermere had passed most of his eventful service in the cavalry, and during the latter part of the Peninsular War had commanded the allied cavalry. As Colonel Stapleton Cotton, of the 25th Light Dragoons (then known as Gwyn's Hussars), he had served at the siege of Seringapatam, where he formed a friendship with Colonel Arthur Wellesley, then commanding the reserves in General

[1] *Naval and Military Magazine* (1827), Vol. II., p. 312.

[2] An interesting memoir of Lord Raglan appeared in this JOURNAL, July, 1896.

(afterwards Lord) Harris's Army. These two young commanding officers, who were both destined to achieve peerages and the highest military rank, were very different in character and held opposite views to each other on many subjects of the day. Lord Combermere (so created in 1814 for his services in the Peninsula) was very fond of the panoply of war. His uniform and horse trappings are said to have been worth a ransom of 500 guineas. In his soldiering days he was familiarly known as the "Lion d'Or." The late Major-General William Sullivan (Colonel of the 58th Foot) used to tell how when he was on duty at the Horse Guards, in the latter days of the Duke of Wellington's life, Lord Combermere called and wished to see the Duke.

Sullivan went to the commander-in-chief's office and gave the message. The Duke said in a very high and irritable voice: "What can that d——d old coxcomb want with me?" It so happened that Lord Combermere, feeling sure of a welcome from his old companion-in-arms, had not waited to be announced, but had followed Sullivan into the Duke's office and so heard his Grace's emphatic remark. Sullivan discreetly retired and left the two great men to fight it out. For his services in taking the strong Indian fortress of Bhurtpore, in 1827, Lord Combermere was created a viscount. His rule in India, as commander-in-chief, was signalised by his abolishing the system of flogging in the Indian Army.[1] At the wedding of the Prince of Wales there was no more conspicuous figure than that of Viscount Combermere, with his many decorations, then aged ninety. As colonel of the 1st Life Guards he was gold stick in brigade waiting.

Sir John Byng, K.C.B. (created Earl of Strafford), twice received the thanks of Parliament for his services in the Peninsula and at Waterloo. The Crown also gave him an augmentation to his arms for conspicuous gallantry at Mouguerre, near Bayonne, 13th December, 1813. He was colonel of the Coldstream Guards.

Of the celebrated Lord Hardinge it may be said that when he was appointed commander-in-chief, on the death of the Duke of Wellington, it was universally felt that the Duke's mantle had fallen on the right shoulders. For his glorious campaign against the Sikhs, during his administration as governor-general of India, the East India Company bestowed upon Lord Hardinge a pension of £5,000 per annum. He died in 1856—just forty-one years after the battle of Ligny, at the close of which sanguinary engagement young Sir Henry Hardinge (as he then was) "lay all night in a wretched hut with his amputated left hand lying by his side."

[1] *Naval and Military Magazine* (1828), Vol. III., Appx. p. clxvi

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made: Admiral—Sir H. Fairfax, K.C.B., to be Commander-in-Chief at Devonport. Vice-Admiral—Sir N. Bowden-Smith, K.C.B., to be Commander-in-Chief at Sheerness. Rear-Admirals—A. D. Fanshawe to be Second-in-Command of Channel Squadron; D. H. Bosanquet to be Commander-in-Chief of East Indian station. Captain—A. W. Paget to "Astræa."

Admiral Sir H. Fairfax, K.C.B., will hoist his flag at Devonport on the 15th inst., in succession to Admiral the Hon. Sir E. R. Fremantle, G.C.B., who has completed his three years of service in the appointment. Rear-Admiral A. D. Fanshawe hoisted his flag on board the "Magnificent" on the 1st inst., as Second-in-Command of the Channel Squadron in succession to Rear-Admiral J. W. Brackenbury, C.B., C.M.G. Rear-Admiral D. H. Bosanquet has been selected to succeed Rear-Admiral A. L. Douglas as Commander-in-Chief in the East Indies, Rear-Admiral Douglas returning to England to assume the post of Second Sea Lord. The first-class cruiser "Edgar" left Portsmouth on the 1st ult., with a new crew for the "Royal Sovereign," which paid off and recommissioned at Malta, arriving at Portsmouth on the 25th ult., with the paid-off crew; the ship left again on the 12th inst., with supernumeraries for the Mediterranean station. The first-class cruiser "Crescent" commissioned at Portsmouth on the 2nd ult. as the flag-ship of Vice-Admiral Sir G. Bedford, K.C.B., the new Commander-in-Chief in North America and the West Indies; Vice-Admiral Sir G. Bedford hoisted his flag on board on the 19th ult., and she left on the 20th for her destination; on her three hours' full-speed natural-draught commissioning trial, the ship maintained her old reputation as a fast steamer, as she averaged 18·7 knots during the trial. The second-class cruiser "Forte" left on the 3rd ult. for the Cape of Good Hope and West Coast of Africa, where she relieves a sister-ship, the "Fox." The sloop "Basilisk" arrived on the 14th ult. from the South-East Coast of America at Devonport and is to be paid off. The second-class cruiser "Tribune" commissioned at Chatham on the 9th ult. and left on the 21st ult. for North America and the West Indies, where she relieves the "Intrepid," a sister ship. The third-class cruiser "Psyche" left Plymouth on the 15th ult., for North America and the West Indies, where she relieves the third-class cruiser "Pallas." The third-class cruiser "Pomone" left Sheerness on the 18th ult. for the East Indies, where she relieves the first-class gun-boat "Redbreast," an exchange of ships which will add materially to the effective strength to that station. The third-class cruiser "Archer" arrived at Plymouth on the 15th ult. from China and paid off at Devonport on the 31st ult. The first-class armoured cruiser "Narcissus" arrived at Portsmouth on the 26th ult. from China and will be paid off at that port. The first-class gun-boat "Partridge" left Sheerness on the 15th ult. for the Cape and West Coast of Africa.

Launch.—The new Royal yacht was launched at Pembroke on the 9th ult., the launching ceremony being performed by the Duchess of York. The first Royal steam yacht, the original "Victoria and Albert," was launched in 1843 and was a paddler designed by Sir W. Symonds. She was built of wood, was 198 feet long on the upper deck, 33 feet beam, and 22 feet deep. Messrs. Maudslay fitted this vessel with double-cylinder engines supplied with steam from tubular boi ers worked at a pressure of 10 lbs. to the square inch, and, with

1,550-I.H.P., the speed attained was 11·7 knots. It was in this yacht that the Queen made her first visit to Ireland, leaving Southampton for Queenstown in August, 1849, and it is on record that the first attention received by Her Majesty in Irish waters was from a fisherman, who, hailing the yacht as she passed him, pulled alongside and presented to the Queen as a tribute of his allegiance and loyalty a magnificent fish which he had just taken with the line. From Queenstown the yacht proceeded to Kingstown, where the Royal party landed and whence visits were made to Dublin and Belfast. This "Victoria and Albert" was, on being superseded by the one now in use, renamed the "Osborne" and was eventually broken up in 1868-69. About the same time a smaller steam yacht, the "Fairy," built in 1845, was sold out of the Service. It was from the deck of the "Fairy" that the Queen witnessed the last naval review of sailing vessels just before the declaration of war with Russia, and it was in this vessel that her Majesty led the Baltic Fleet to sea from Spithead in 1854 and signalled "God speed" to Sir Charles Napier in his flag-ship the "Duke of Wellington." The above-named vessels, with the "Elfin," a small paddler of 93 tons displacement, launched at Chatham in 1849 and still running between Portsmouth and Cowes, belonged to the early period of steam propulsion; they were followed by three vessels in which every kind of improvement suggested by experience as suitable to their size and employment was introduced; these are the "Victoria and Albert," originally laid down at Pembroke as the "Windsor Castle" in 1854 and launched in the following year, the "Alberta," built as as tender to the larger yachts and launched at Pembroke in 1863, and the "Osborne," also built at Pembroke and launched in 1871. The last-named bas been chiefly devoted to the service of His Royal Highness the Prince of Wales and his family.

The present Royal yacht "Victoria and Albert" was built at Pembroke Dockyard, and launched on January 16th, 1855. She was constructed of wood, with special arrangements of framing, and three thicknesses of planking, so as to secure the association of strength with lightness. Her length between perpendiculars is 300 feet; length over all, 338 feet; beam, 40 feet 3 inches; mean draught of water, 16 feet 3 inches; and displacement, 2,470 tons. At the time of her construction she was justly regarded as a vessel of exceptional proportions and very high speed. She is propelled by paddle-wheels, and on her earlier trials attained a speed of about 16¾ knots for a short run on the measured mile, with 3,000-I.H.P. The machinery was made by Messrs. Penn. During the whole of her long service she has maintained her reputation as a good steamer, and as a vessel of remarkably graceful form. Many additions have been made since her construction in order to increase efficiency and comfort. The electric light has been introduced, artificial ventilation added in some parts of the vessel, and other changes in detail have been carried out. In all the main features, however, the yacht remains as designed.

The new Royal yacht has been constructed of steel; the interior is divided into a large number of water-tight compartments. There is a cellular double-bottom extending from bilge to bilge, and this "inner skin" is virtually carried up above water by the side coal-bunker bulkheads. Decks and platforms are also made water-tight where required. In addition to these structural arrangements, further security is provided, and freedom from serious fouling of the bottom obtained by sheathing over the steel hull with teak planking, outside which copper sheathing is fastened. This wood sheathing in steel-hulled ships usually extends only a few feet above the deep-load water-line. In the Royal yacht it is carried right up to the upper deck, the copper stopping a little above the water-line. Comfort is thus increased by securing a more equable temperature, especially if the vessel should proceed to very hot or very cold climates, and a better external appearance is also obtained. The design for the new yacht was prepared by Sir William White, Director of Naval Construction, speed and accommodation having been arranged in accordance with Her Majesty's wishes. It was decided that

comfort should not be sacrificed for the purpose of securing a very high speed, and a sustained sea speed in fair weather of about 17 knots was named in the design in association with a speed of 20 knots on the measured-mile trial of eight hours. The coal supply was fixed at an amount sufficient to steam about 2,000 knots—say from Portsmouth to Malta—at a speed of about 14 knots.

The accommodation for Her Majesty and the members of the Royal Family, with their suites and servants, is considerably greater than that existing in the present "Victoria and Albert." The new yacht, moreover, has been fitted throughout in a manner adapted for longer voyages. Her higher speed and greater size necessitated a larger complement of officers and men, for whom it was necessary to provide accommodation on a scale and of a character suitable to modern conditions. As a result, the new yacht is of much larger dimensions than her predecessor. Her length between perpendiculars is 380 feet; length over all, 439 feet; beam, 50 feet; mean draught of water (under normal conditions of loading), 18 feet; displacement, 4,700 tons, maximum I.H.P., 11,000-H.P. Paddle-wheels would, of course, have been unsuitable in a sea-going ship of this size and power. The vessel will be propelled by twin screws, driven by two inverted vertical-cylinder engines, each engine having four cylinders, and being placed in separate water-tight compartments. Steam will be provided by 18 water-tube boilers of the most improved Belleville type, fitted with economisers. There are two separate boiler-room compartments, each containing nine boilers. Two funnels will be fitted. Messrs. Humphrys and Tennant have been entrusted with the contract for the engines and boilers, which are far advanced and will be ready to be put on board immediately after the launch. In the design and manufacture of the machinery extreme care has been taken to minimise vibration in the vessel when under steam. The ventilation of the machinery and boiler compartments has also received great attention. The electric installation will be of a special character. It will provide not only for electric lighting of the interior, but for other applications of electrical power, including the working of lifts, pumps, hoists for boats, ventilating fans, the after capstan, and heating the principal apartments. By using electricity instead of steam for these auxiliary services, it is anticipated that comfort and efficiency will be increased.

As compared with the present "Victoria and Albert," the new yacht has an additional deck, which may, for purposes of description, be regarded as built above the upper deck of the present Royal yacht. This increase in freeboard, from about 11½ feet to 19 feet, was absolutely necessary to provide the desired accommodation, as well as to meet the requirements for more powerful machinery and enlarged coal supply. The "state deck" of the new yacht is about 10¾ feet above water. Between it and the upper deck are situated Her Majesty's apartments and those of the Royal Family, the cabins assigned to their suites, and those appropriated to the commanding officer and the principal naval officers attached to the vessel. The apartments of Her Majesty resemble in their general arrangements those in the "Victoria and Albert," but they are more spacious, and a private dining-room has been added. These rooms occupy the central portion of the state deck, where the minimum of motion in a seaway should occur. The apartments of the members of the Royal Family are placed abaft those of Her Majesty, extending over a considerable length on the state deck. These are succeeded by the apartments of the Royal suite. Rather more than half the length of the vessel is occupied by these three series of apartments, and a wide corridor extends from end to end, with convenient staircases leading to the upper deck. Above the upper deck, towards the after part, is built a large pavilion or saloon, which contains the state dining-room that will accommodate 50 persons, besides reception and smoking rooms. The top of this pavilion forms a promenade. The grand staircase leads down from the reception-room to the principal corridor on the state deck. Access from the upper to the state deck

within the Royal apartments will be obtained by a lift as well as by this staircase. Arrangements have also been made for entering the vessel at the level of the state deck, should that prove more convenient, either when she lies alongside piers or when passengers embark from boats and ascend accommodation ladders. The cabins for the Royal servants and for servants of the suite are placed on the lower deck, occupying about half the length from the stern. On this deck also are placed the Royal kitchen, pantries, sculleries, hot cupboards, etc., and all the service will proceed at this level to the lifts leading to the Royal dining-rooms and the dining-room of the suite. Arrangements will be made for economising labour as far as possible by means of lifts or other appliances.

The officers of the ship have their cabins immediately before the middle of the ship, part on the state deck and part on the lower deck. At the higher level a large mess-room is built, with all necessary pantries and fittings adjoining. The crew spaces are at the fore end of the vessel, where there are three decks, all with natural light and ventilation. Adequate provision has been made for messing and sleeping, for bath-rooms and all other requirements. All living spaces on the lower decks have special ventilating side-scuttles giving light and air under all circumstances even in bad weather at sea. In addition, electrical ventilating appliances will be provided. Great attention has been given to the sanitary arrangements. Hot and cold water supply will be arranged to bath-rooms and to the principal sleeping cabins. Electrical heating will be adopted in the state apartments, and steam heating elsewhere. In order to ensure the greatest possible safety against fire, the wood used in the bulkheads, fittings, and furniture of the new yacht has been subjected to a chemical treatment which makes it practically uninflammable. An efficient "fire service" of the usual kind has also been arranged for delivering water at any point where a fire may take place.

It is anticipated that she will be ready for her steam trials towards the end of the present year, when she will leave Pembroke for Portsmouth. After the machinery trials are successfully completed the vessel will be taken in hand for completion at Portsmouth. Probably by the early summer of 1900 the new yacht will be ready for service. Her general appearance will somewhat resemble that of the "Victoria and Albert," but her greater size and higher freeboard necessarily involve departures from the earlier vessel. She will have three tall raking masts, two funnels, a clipper bow, and an elliptical stern.—*Précis* from *Times*.

Steam Trials.—The experimental trials of the gun-boat "Sheldrake," with the Babcock and Wilcox type of water-tube boilers, continue to give the highest satisfaction. Of the nine runs, each of 1,000 miles, to test the boilers under varying circumstances, four have been completed, and each trial has been found to be an improvement on the preceding one as regards economic coal consumption, the ease with which steam can be maintained, the durability of the tubes, and the other features which contribute to the general efficiency of steam boilers. The fourth trial was the last at 1,500-H.P. and took place in the Channel under favourable conditions. The boilers were worked without interruption for 68 hours, the average speed being 14·7 knots per hour. The coal was of better quality than that used during the previous trial, being of very light weight, and quick burning. The coal consumption worked out at 1·59 lbs. per I.H.P., which is better than for either of the three preceding runs. The total heating surface registered was 6,528 square feet, and the grate surface 189 square feet, the coal consumption for the latter surface being 15·1 lbs. per square foot. The heating and grate surfaces for the 1,500-H.P. are also satisfactory in proportion to the estimated totals for the full H.P. of 3,500. The boilers are quite as good as they were when the trials commenced, no weakness or defect having shown itself, and the experience which has been gained by the engine-room hands in the short time during which the "Sheldrake" has been in commission for experimental purposes is calculated to be of value during the remainder of the trials. The fifth trial was at 1,800-I.H.P., and the boilers worked

satisfactorily during the run of 1,000 miles. The coal consumption was, however, rather high compared with the previous trials owing to the inferior character of the coal, and it is uncertain for this and other reasons whether the trial will be recognised as one of the series. The programme includes a second trial at 1,800-I.H.P., one at 2,000-I.H.P., and a concluding run at full power. As far as the trials have gone they compare very favourably with those of the "Sharpshooter," which is fitted with Belleville boilers, but no comparison will be made until the "Sheldrake" has completed her programme.

The second-class cruiser "Pique," which has been refitted at Devonport at a cost of £10,000, has lately completed her trials and is now ready for commissioning. The "Pique" was built in 1889-90, and although she has since served a commission on the China station, and has twice taken part in the naval manœuvres, she is still able to steam at the same rate of speed as was attained when she ran her contractors' trials off Plymouth nearly ten years ago. The trials last week included one of two hours at full natural-draught power, when the mean results recorded were:—Steam, 146 lbs.; vacuum, starboard 28 inches, port 28·5; revolutions, starboard 127, port 127; I.H.P., starboard 3,697, port 3,496—total 7,193; air pressure, ·45 inch; speed, 18½ knots.

The new third-class cruiser "Pyramus," which was built by Messrs. Palmer and Co. (Ltd.), has carried out her trials successfully. The results of the 30 hours' coal-consumption run at 3,500-I.H.P. proved satisfactory, the official details being as under:—Draught of water, forward 12 feet 9½ inches, aft 15 feet 7½ inches; speed of ship, 17·49 knots; steam pressure in boilers, 245 lbs. per square inch; vacuum in condensers, starboard 27, port 27·4; revolutions per minute, starboard 176·2, port 176·8; mean I.H.P., high, starboard 550, port 516; intermediate, starboard 636, port 615; low, starboard 651, port 637; total—starboard 1,837, port 1,768; grand total, 3,605. The total consumption of coal was 222,225 lbs., which works out at 2·05 lbs. per I.H.P. per hour. The results of the eight hours' natural-draught trials were also very satisfactory. Both the contract speed and H.P. were considerably exceeded, while the machinery worked smoothly. The official details were:—Draught of water, forward 12 feet, aft 15 feet 4 inches; speed of ship, 19·9 knots; steam pressure in boilers, 247 lbs. per square inch; vacuum in condensers, starboard 27·3, port 27·2; revolutions per minute, starboard 204·2, port 205·9; mean I.H.P., starboard 2,678, port 2,746—grand total, 5,424. The coal consumption was 106,950 lbs., which gives 2·46 lbs. per I.H.P. per hour. The results of the four hours' full-speed trials were satisfactory and were as follows:—Draught of water, forward 12 feet, aft 15 feet 3 inches; speed of ship, 20·7 knots; steam pressure in boilers, 261 lbs. per square inch; vacuum in condensers, starboard 26·1, port 26·2; revolutions per minute, starboard 220·4, port 220·2; mean I.H.P., starboard 3,613, port 3,690 - total, 7,303. The whole of the trials proved satisfactory.

On the 5th ult., the new torpedo-boat destroyer "Mermaid," which has been built and engined by Messrs. R. and W. Hawthorn, Leslie & Co. (Ltd.), of Newcastle-on-Tyne, completed her full-power speed trial on the measured mile off the Maplin Sands with very satisfactory results, and proved herself to be the fastest vessel of the 30-knot destroyer class yet tried.

The "Mermaid" is 210 feet long by 21 feet beam, and had a displacement of 320 tons when carrying the specified load at the commencement of the trial. The machinery consists of twin-screw, three-crank, triple-expansion engines, having cylinders 19 inches, 29 inches, and 46 inches, by 18-inch stroke. The cranks are set at 120°, and balance weights are fitted upon the high-pressure and low-pressure cranks to counteract the vibratory forces. Throughout the trials the vibration was very slight, and the whole of the machinery ran without the slightest hitch. Steam is supplied by four water-tube boilers of the Thornycroft type, having a total heating surface of about 13,200 square feet, and worked at a maximum pressure of 250 lbs. per square inch.

The mean results of the six consecutive runs on the mile were as follows:—

No.	Time.	Speed.	Revolutions (mean).
	Hrs. Mins. Secs.	Knots.	
1	2 0 5	29·901	395·2
2	1 55 0	31·304	395·5
3	1 57 8	30·562	403·9
4	1 56 2	30·986	394·2
5	1 55 0	31·304	414·7
6	1 56 4	30·928	394·8
		Mean—30·927	Mean—400·875

The general results of the three hours' trial were as follows:—

Draught of water, forward	5 feet 3⅛ inches.
,, ,, aft	8 ,, 3⅝ ,,
Speed of ship, knots per hour, six runs ...	30·926
,, ,, ,, ,, three hours ...	30·833
Steam pressure in boilers...	225 lbs. per square inch.
Air pressure in stokeholds	4·96 inches of water.

——		Starboard.	Port.
Vacuum in condensers	inches	22·8	22·1
Revolutions per minute		397·8	395·4
Mean pressure in cylinders — High	lbs.	95·9	97·7
Mean pressure in cylinders — Intermediate ...	,,	51·3	50·8
Mean pressure in cylinders — Low	,,	17·8	18·0
Mean I.H.P. — High		982	992
Mean I.H.P. — Intermediate		1,220	1,204
Mean I.H.P. — Low		1,068	1,075
Total		3,270	3,271
Grand total		6 541	

It will be seen from the above that the high speed of 30·833 knots was obtained with a very moderate power.

The "Mermaid" has on all her trials been extremely successful. On her first trip to sea for the contractors' preliminary trial, she obtained a mean speed of 30 knots, a performance which it is believed has not been previously accomplished by any vessel. On the Admiralty observation trial, before leaving the Tyne, a speed of nearly 31 knots was obtained, and upon her official consumption trial a speed of 30·149 knots was maintained for three consecutive hours in unfavourable weather. Her full-speed trial is as above described. It will thus be seen that this vessel has not once gone to sea on trial without obtaining the contract speed and maintaining it for the necessary specified time.

The new torpedo-boat destroyers "Orwell" and "Cygnet" have also completed their trials satisfactorily, making 30·7 on the measured mile and an average of 30·2 on the three hours' run, and 30·6 on the mile and an average of 30·3 on the hour's run with 393 revolutions respectively.

The new first-class gun-boat "Dwarf" has been undergoing her trials. On the 30 hours' run the mean speed attained was 11·6 knots; the coal consumption was 2·23 lbs. per I.H.P. per hour; the pressure of the steam in the boilers was 193 lbs.; vacuum, starboard 25 inches, port 25·3 inches; revolutions, starboard 227·6, port 227 5; I.H.P., starboard 350, port 352—total, 702; air

pressure, ·27 inch. In her eight hours' trial under natural draught the mean results were :—Steam in boilers, 212 lbs. ; vacuum, starboard 25·5 inches, port 25·4 inches ; revolutions, starboard 237·7, port 255·4 ; I.H.P., starboard 483, port 476—total, 959 ; air pressure, ·4 inch ; speed 13·1 knots. The "Dwarf" had a satisfactory four hours' trial recently at 1,300-H.P.

The third-class cruiser "Barham" has had a satisfactory eight hours' trial at Portsmouth, after a complete refit, including the substitution of seven Thornycroft water-tube boilers for her former steam generators. The vessel drew 11 feet 9 inches forward and 14 feet 9 inches aft. The vacuum was 26½ inches starboard and 27½ inches port ; the pressure in the boilers was 147 lbs., while the revolutions were 191·9 starboard and 191 port. The total I.H.P. was 4,490, and with a mean air pressure of ·39 inch a speed of 18·6 knots was realised. The three hours' forced-draught trial was also satisfactory. She drew 11 feet 9 inches forward and 14 feet 9 inches aft, and with 145 lbs. of steam in the boilers, it was found that the former difficulties with regard to vibration and the failure of the reducing valves between the boilers and engines had entirely vanished. The vacuum was 25·2 inches starboard and 25·3 inches port, while the revolutions were 210·6 starboard and 210·7 port. The total I.H.P. was 3,076 starboard and 3,074 port, or a total of 6,150. The mean air pressure was 1·9 inches. The vessel was required to realise at least 6,000-I.H.P., but the best hour's run produced a total of 6,400.—*Engineer* and *Naval and Military Record.*

Liquid Fuel.—Ever since the discovery of petroleum in Pennsylvania in 1859 experiments have been made, remarks Commodore G. W. Melville, U.S.N., in *Cassier's Magazine*, for utilising some of its products as fuel, and these have been so far successful that there are now numerous forms of burners which are efficient and reliable, both for crude petroleum and for the reduced oil. The conditions on board ship require that the oil shall have a high flash point, so that there shall be no danger from volatile gases, and this restricts the possible fuel to petroleum refuse, called *astatki* in Russia, and to "reduced oil," or fuel oil, in the United States, which is practically the same thing.

The advantages of liquid fuel are well known, and have been repeatedly stated, the best presentation of the subject being Colonel Soliani's article before the Engineering Congress at Chicago in 1893. From the Italian experiments there described one very important fact is deducible which is worth noting, as it corrects a very common, but mistaken, notion, namely, that the use of steam for atomising the oil is inadmissible on account of the large amount that would be required. In these experiments it was found repeatedly that the steam used for atomising was less than 2 per cent. of the amount vapourised.

Inasmuch as the evaporative power of fuel oil is from 1·5 to 1·7 times that of coal, a simple calculation will show that, in one of our first-class torpedo-boats, if enough space be reserved for fresh water to make up for the steam used in atomising, the amount of fuel oil that can be carried in the present bunker capacity will more than equal the evaporative effect of the total amount of coal now carried. This is important, because the steam atomisers involve very little complication, while the use of compressed air involves a good deal.

Another point in connection with the use of fuel oil which should be carefully noticed is that many people conclude, because fuel oil has a greater calorific value than coal, that a boiler worked with liquid fuel will necessarily have a greater power than one worked with coal. This inference is not only not justifiable, but is probably erroneous. The experiments thus far made with liquid fuel under high forcing have shown a rate of combustion equivalent to only about 55 lbs. of coal per square foot of grate, while there are reliable *data* of coal having been burned at the rate of more 80 lbs. per square foot of grate. There are practical difficulties in the way of providing an adequate supply of air for burning the fuel oil in large quantities under a given boiler that make it seem probable that, where the very highest results must be obtained, coal will be used.

The cost and difficulty of obtaining fuel oil in all parts of the world have thus far prevented its general use, and, as far as can be seen now, seem likely to continue to that effect.

FRANCE.—The following are the principal promotions and appointments which have been made: Vice-Admirals—P. C. Dieulouard to be Commander-in-Chief of the First Arrondissement Maritime (Cherbourg); M. E. de Maigret to be Chief of the General Staff at the Ministry of Marine. Capitaine de Vaisseau—V. Y. I. Imhoff to "Bretagne." Capitaines de Frégate—P. Auvert, A. Schlumberger to Capitaines de Vaisseau; A. Guillon to "Cassard"; F. L. Grosse to "Lévrier"; A. M. Poidloue to "Fleurus."—*Le Journal Officiel de la République Française.*

In the Dockyards:—

Brest.—The armour for the turrets of the first-class battle-ship "Charlemagne" has at last been received, and the work of completing her for sea is now being pushed on as rapidly as possible. The torpilleur-de-haute-mer "Alarme" and the torpedo-boat No. 75 belonging to the *Défense-Mobile* of St. Servan have been placed in the dockyard hands for repairs.

Cherbourg.—The Maritime Prefect Vice-Admiral de Maigret has been selected to succeed Vice-Admiral Cavelier de Cuverville, who is being retired for age, as Chief of the General Staff of the Navy; as Vice-Admiral de Maigret is only fifty-eight he has still seven years to run on the active list. His successor as Maritime Prefect is Vice-Admiral P. C. Dieulouard, who, although the junior vice-admiral on the list, will have to retire for age in four years; as a rear-admiral he commanded one of the three divisions of the Mediterranean fleet.

Toulon.—Preparations are being made for the launch of the first-class armoured cruiser "Jeanne d'Arc," whose first keel plate was laid as long ago as the 24th October, 1896. The work of reconstructing the two coast-defence battle-ships "Indomptable" and "Caïman" is to be taken in hand, the Minister of Marine having approved of the plans; four 3-pounder Q.F. guns are to be substituted for four 1-pounders at present carried on the lower bridge, the wooden planking of all the decks above the armoured one is to be removed and linoleum laid down instead, and it has been decided to retain the above-water torpedo-tubes, although many officers consider it is a mistake to do so.

The Défenses-Mobiles.—The Minister of Marine has decided to add five of the new first-class torpedo-boats, which are to be ready this year, to the *Défense-Mobile* of Toulon; they will be Nos. 225, 226, 233, 234, and 235. As soon as they are ready for service three of the boats of the "Balny" type will be detached from Toulon to strengthen the flotilla in Corsica, where they will replace three of the older boats. It is further intended to send the five torpedo-vedette-boats Nos. 30, 56, 57, 58, and 59 for service in Indo-Chinese waters. It has been decided that the coast-defence ship "Tempête" and the armoured gun-boat "Achéron," the depôt-ships of the *Défense-Mobile* in Tunis, shall be kept in the First Category of the Reserve with special complements, while the torpedo-aviso "Fléche" will remain in full commission; in addition, sufficient men will be kept at Bizerta to provide crews for all the torpedo-boats in the Reserve there in case of mobilisation.

Trial Trips.—The new first-class cruiser "Guichen," one of the two commerce-destroyers so-called, has been continuing her trials at Toulon, but up to the present with unsatisfactory results; she is supposed to have a speed of 24 knots, but it has only been possible as yet to get 21 knots out of her, and that with difficulty; it has now been decided to reduce the diameter of the propellers, increase the revolutions, and also to alter the disposition of the weights on board. The general results of the trials of this ship have been so disappointing that, as far as possible, all the details are being kept dark.

The new torpedo-boat destroyer "Durandal" has been carrying out her trials at Cherbourg successfully, having maintained a mean speed of 27·4 knots with 301 revolutions, or a knot over the speed required by the contract. The *Yacht* claims for the "Durandal" class, that, although nominally they have a less speed than the English destroyers, yet that they are stronger built, are better sea-boats, and consequently can maintain a high speed under circumstances when the English destroyers would be unable to do so. This, however has yet to be proved, as there is no very great difference in the relative dimensions of the French and English vessels. The English 30-knot destroyers vary in length from 210 feet to 227 feet 6 inches, and in beam from 19 feet 6 inches to 22 feet, with displacements varying from 285 to 324 tons. The "Durandal" is 180 feet 5 inches long, with a beam of 19 feet 5 inches and a displacement of 300 tons, while the four latest destroyers of the "Épée" type are slightly larger, viz., 185 feet 9 inches long with a beam of 19 feet 6 inches and a displacement of 319 tons.

New Ships.—The contract for the construction of the first-class armoured cruiser "Sully," one of the modified "Montcalm" type, has been signed with the Forges et Chantiers de la Méditerranée at La Seyne near Toulon by the Minister of Marine. Her dimensions are to be as follows:—Length, 448 feet 6 inches; beam, 65 feet 6 inches; with a mean draught of 22 feet 9 inches on a displacement of 10,000 tons. The armament will consist of two 19·4-centimetre (7·6-inch) guns in turrets, one forward and one aft; eight 16·4-centimetre (6·3-inch) Q.F. guns, four in small turrets and four in armoured casemates; six 10-centimetre (3·9-inch) Q.F. guns on the spar-deck, which is two more than in the "Montcalm" class; there will also be eighteen 3-pounder and six 1-pounder Q.F. guns, with two submerged torpedo-tubes. The "Sully" will have a 6-inch belt of Harveyized steel, tapering to 3 inches towards the extremities, while the guns will also be protected by 6-inch armour, except the 3·9-inch guns, which will have 2-inch shields. There will be three screws, and under forced draught the speed will be 21 knots, while the mixed coal and petroleum fuel will give her at 10-knot speed a range of action of 10,000 miles.

The Minister of Marine has also signed a contract with the Forges et Chantiers de la Méditerranée of Havre for the construction of a vedette-torpedo-boat of 40 tons, which is to be driven by a turbine-motor following the plan of the "Turbinia"; this little vessel is to be called the "Libellule."

The following vessels are under construction in different private yards:—

La Seyne, Toulon.—The first-class armoured cruiser "Montcalm," and the commerce-destroyer "Châteaurenault"; the latter is almost ready for her trials, while the former is to be completed next year.

Bordeaux.—The first-class armoured cruiser "Kléber," the third-class cruiser "Infernet," and six torpedo-boats; the "Kléber" will not be completed until 1901, the "Infernet" ought to be ready for her trials this year; while of the torpedo-boats, Nos. 230, 239, 240, and 241 will be finished this year, and 231 and 232 will be completed by next spring.

Saint-Nazaire.—The first-class armoured cruiser "Desaix."

Nantes.—Two torpedo-boat destroyers, the "Framée" and "Yatagan," will be completed next year; two squadron torpedo-boats, the "Trombe" and "Audacieux," are also to be finished next year; while three torpedo-boats, Nos. 236, 237, and 238, ought to be completed this autumn.

Havre.—Five torpedo-boat destroyers, the "Hallebarde," "Fauconneau," "Espingole," "Pique," and "Épée" should all be completed this year; four squadron-torpedo-boats, the "Siroco," "Mistral," "Simoun," and "Typhon," of which the first two should be completed this year, and the other two in 1900, while eight torpedo-boats are in different stages of construction.

Creusot.—Five first-class torpedo-boats, Nos. 219, 220, 233, 234, and 235, with six second class boats, C, D, E, F, H, and I, are also in different stages of

completion. Contracts have yet to be signed for two first-class armoured cruisers, one estafette-cruiser, two torpedo-boat destroyers, four squadron torpedo-boats, and eleven first-class torpedo-boats.—*Le Yacht* and *Le Moniteur de la Flotte.*

GERMANY.—Rear-Admiral H.R.H. Prince Henry of Prussia took over the command of the Cruiser Squadron from Vice-Admiral von Diederichs at Shanghai on the 14th April last. H.R.H. Prince Adalbert, third son of the Kaiser, who is 15 years old and holds the rank of sub-lieutenant, embarks this month on board the training-frigate "Charlotte" for a nine months' cruise in foreign waters. The ship proceeds first to the Mediterranean, then through the Suez Canal to Zanzibar and the East Coast, round the Cape of Good Hope to Rio de Janeiro, the West Indies, and then home.

Movement of Ships.—The third class cruiser "Arcona" arrived at Wilhelmshaven at the end of last month from China; she is to be paid off, and, as she is quite of an obsolete type, will not be employed on foreign service again, although she will be probably used as a training-ship. The second-class cruiser "Prinzess Wilhelm" is to be detached from the Cruising Squadron in China and to return home on the arrival of the new second-class cruiser "Hansa" on the station; since 1887 this ship has been continually in commission, and for the last six years has been in Chinese waters. The training-ship "Grille" was commissioned at Kiel at the beginning of last month for the instruction of officers in knowledge of the coast, and on the 1st August she will be attached to the Scouting Division of the Manœuvre Fleet. The "Ulan" has also been commissioned as tender to the gunnery training-ship "Mars," and is to be employed in carrying out experiments in shrapnel firing; the gun to be used is the 15-centimetre (5·8-inch). The third-class battle-ship "Sachsen," which is to join the Second Division of the First Squadron, is undergoing her trials successfully; during a three hours' forced-draught trial the engines developed 5,940-I.H.P., making 92 revolutions, giving a speed of 14·5 knots.

The First Torpedo Flotilla assembled at Kiel at the end of April. It is made up of A (III.) and B (II.) Torpedo-boat Divisions, constituted as follows:—

Torpedo-aviso—"Blitz" (senior officer).

A Division.

Torpedo-division boat—D 7.

Torpedo-boats Nos. 58, 59, 60, 61, 62, and 63.

B Division.

Torpedo-division boat—D 6.

Torpedo-boats Nos. 50, 51, 52, 53, 56, and 57.

Work in the Dockyards.—The water-tube boilers for the new battle-ship "Kaiser Wilhelm II." have been received at Wilhelmshaven from the Germania Factory at Kiel. Work on the new first-class armoured cruiser A building in the dockyard at Kiel is being pushed on, so that the ship may be ready for launching in the coming autumn; she is to have fourteen water-tube boilers on the Dürr system, similar to those supplied to the second-class cruisers "Vineta" and "Victoria Luisa." Cruiser A is of quite a new type, and stands midway between the "Fürst Bismarck" of 10,656 tons, and the "Freya" class of 5,628 tons; she will have a displacement of 8,868 tons and will have engines devolping 15,000-I.H.P., giving a speed of 20·5 knots, as against the 13,500-I.H.P. of the "Bismarck" and her 19 knots.

Launch.—On the 1st inst. the new first-class battle-ship "Kaiser Wilhelm der Grosse" was launched from the Germania Yard at Kiel in the presence of the Kaiser, the Kaiserin, the Grand Duke and Duchess of Baden, and a number of high officials. The Grand Duchess, who is a daughter of the late Emperor William, broke the bottle of wine on the ship's ram and then cut the cord which released her, after

the Kaiser had first named the ship in the following characteristic address:—"Wrought out of metal, the ship stands before us, a motionless, lifeless form, ready to depart. Her lines scarcely agree with the spectators' ideas of beauty, and yet at the moment the Colossus dives into the waves she gains life and strength. As soon as the sea with its infinite magic, which no one can resist, shall have touched her, we shall see her come to life, and when at some future time, manned by hundreds of brave seamen, commanded by gallant officers, she is riding proudly upon the waves, she will present herself as a new testimony of German strength at sea, of which our Fatherland stands so much in need. Conceived in German minds, built by German men, one of whom, like a soldier on the battle-field, ended his life in this place yesterday, she has been forged into shape by the doughty hammer-blows of German workmen, and now at the moment when she weds the sea, she must receive a name, taking the place, as she does, of the first great battle-ship of the Prussian Kingdom, which for thirty years bore with honour the name 'Koenig Wilhelm.' May the vessel remind us, then, of the old warrior, the great organiser of the Army, the forger of the German weapons, who created the implements with which we won our unity. May she be an assurance to our peaceful merchants, our workmen, and our artisans, that wherever they may be in the world the German Empire will protect them. Just as the old ironclad recalled 'King William,' so shall this ship remind us of the Emperor who united the German princes and peoples by a new bond, and raised our beloved German Fatherland into the front rank of nations. By the hand of the daughter of the Emperor William, whom I greet with reverence, I christen thee 'Kaiser Wilhelm der Grosse.'"—*Neue Preussische Kreuz-Zeitung.*

The Autumn Manœuvres.—The Kaiser has issued the following Order with regard to the manœuvres:—"I direct that this year's Autumn Manœuvres of the fleet shall take place between the middle of August and the middle of September. The following ships will take part, viz., the battle-ships of the 1st Squadron; the 2nd Squadron, which will be formed later of the coast-defence armour-clads; the armoured gun-boat Reserve Division; the two torpedo-boat flotillas, as well as the following specified vessels:—the Gunnery School-ship 'Blücher,' with the small cruisers 'Wacht,' 'Hela,' 'Blitz,' 'Greif,' and 'Grille'; the small cruiser 'Zieten,' and the special-service vessel 'Pelikan' will also take part in a portion of the manœuvres after arrangement between the Secretary of State for the Navy and the Commander-in-Chief of the fleet. The place and date of assembly and dispersal of the fleet, as well as the commissioning arrangements, are to be settled between the Secretary of State and the Commander-in-Chief, and a report on the subject made to me.—WILLIAM."—*Marine Verordnungsblatt.*

RUSSIA.—*The "Ermack."*—We have been obliged to defer, through want of space, any account of the large ice-breaking steamer "Ermack," built for the Russian Government by Sir W. G. Armstrong, Whitworth & Co., at their yard at Walker. She is an extremely interesting vessel, and, in view of the success which attended her arrival at Cronstadt last winter, when she cleared a way for herself without difficulty through thick ice, it looks as if the Russian fleet can no longer be considered as ice-bound, when wintering in the Baltic ports or Vladivostok—a fact of very considerable importance, in the event of Russia finding herself engaged in a naval war.

The "Ermack" is the pioneer of the pelagic ice-breakers, that is to say, she is the first vessel of the class which has been designed to attempt the formidable task of opening tracks through the ice-bound seas, and convoying steamers to ports that have hitherto been considered unapproachable in winter. The ice-breaking steamer is, of course, no novelty, but her radius of action so far has been extremely limited, and until the subject of pelagic ice-breaking was taken up by Vice-Admiral Makaroff, of the Imperial Russian Navy, nothing was attempted on this side of the world beyond keeping a track open through the fringe of ice which surrounds some of the Baltic ports in winter.

The problem given to the builders was to design a vessel of such form and strength as to be capable of being propelled into thick field ice by machinery of 10,000-H.P. without suffering damage. It is, of course, impossible to predict exactly how far this problem may be solved, but the "Ermack," has certainly given promise of successful achievement in her future struggles with the ice.

It is obvious that the only way to minimise the blow upon so solid a material as Arctic ice of some 10 feet in thickness is to prolong the period of impact as much as possible. This has been attempted by designing the bow with a very long overhang, so that the attack on the ice takes the form of a sliding blow, and if the resistance encountered is more than sufficient to overcome the breaking strain thus produced, the momentum of the vessel is expended in lifting the bow on to the top of the ice; meanwhile the water supporting the ice is violently disturbed by the action of a propeller arranged under the cutaway bow, so that under the effect of the weight of the vessel acting above, and enhanced by absence of support below, the ice gradually yields. The action thus described will take place continuously when working in thick ice.

The ship is 305 feet long, 71 feet wide, and 42 feet 6 inches deep, and she is propelled by four screws. The results of the steam trials showed that the speed with 8,000-I.H.P. was nearly 15½ knots. The speed with the three after engines working ahead was about 15½ knots, and the speed with all the engines running ahead was about 16¼, the power in each case being at the maximum. The highest I.H.P. developed was 12,000, and this, we understand, corresponds with the speed of 16¼ knots. With the three after engines working ahead and the forward engine working astern the power was 11,250, of which the forward engine was never developing more than 2,000.

What is far more to the purpose is that the ship made her first voyage most successfully. Vice-Admiral Makaroff, who went in her, first met the ice in the Baltic. It was drift ice, apparently about 5 feet thick, and judging by the report of Mr. Gulston, of Newcastle, who accompanied Admiral Makaroff on his voyage, there seems to have been not the slightest difficulty in getting the "Ermack" through this obstruction, as she went comparatively easy at 9 knots, the engines working slowly. Before going into the ice the vessel had been slowed down to 10 knots, so as to reserve the powers of the engine-room staff for the harder work which was to come.

The worst piece of ice which was encountered was estimated at 25 feet thick, and the ship went nearly through this formidable obstruction before she was brought up by it. Accurate measurements were taken as far as possible, and the report reads that the field ice was 5 feet in thickness, the pack on the top was 9 feet, and there was ice below the field amounting to 11 feet, so far as it could be measured, but may have been more, as there was no means of measuring a greater distance below the bottom of the field. It was evident that a larger mass of ice had been washed off a shoal place and had frozen on to the field.

The worst field ice that they had much of was apparently 4 feet thick, with snow on the top of it. The snow seems to be the greatest impediment to the vessel's progress, as the designers of the ship had always been led to expect. Mr. Gulston reported that 12 inches of snow is a serious impediment, and 18 inches almost blocks her; this is, of course, on the top of a thick field of ice.

The ice generally in the Baltic appears to have been much more serious last winter than was expected, and it is said to be beyond 1883, which we gather was a record winter. The "Ermack" did not run continuously, but rested at night and started early in the morning, working with the search-light. There was apparently no difficulty in starting, although the ship had become fast in the ice. Ice anchors were put out and the vessel was warped backward from her berth, after which she started apparently without any difficulty. One of the most satisfactory features is that she steers, as Mr. Gulston says, "in any way, at any time, in any ice." This has never been the case with any ice-breakers that have previously been built, and is

no doubt due largely to the form of the ship. As already stated, there is no flat place in her side either vertically or horizontally, so that unless absolutely frozen in solid she can be given some movement, and can thus be worked loose by her own propellers and by ice anchors laid out.

Her arrival at Cronstadt was evidently an extraordinary sight. The ice was about 18 inches thick, with a good deal of snow on the top, and the ship steamed through this at 6½ knots up to the sea wall and past the battle-ships. She swung round on the port hand and entered the harbour through an entrance only 95 feet wide; the ship, it will be remembered, is 71 feet beam. She swung once in the inside harbour and one charge astern put her into her berth alongside the coal store. Some manœuvring trials were made in ice of about 2 feet to 3 feet in thickness, when the turning circle was found to be about 600 feet, and there was apparently very little difference in which direction the ship was turned. The effect of the bow propeller was most marked, and the result seems practically to be that, if the bow propeller is stopped, the ship stops too.

Mr. Gulston examined the ship both inside and outside as far as he could, and could find absolutely no sign of weakness. The outer skin was polished bright where the vessel had been running through the ice, but there were no signs of leakage anywhere. The ice varied enormously in quality. Drift ice was passed through and appeared to offer practically no impediment. Pieces described as being quite 2 to 3 acres in extent were apparently pushed aside, the ship moving through quite easily. Pack ice with 18 inches of snow on the top appears to have been the greatest difficulty. Field ice of about 18 inches to 2 feet seems to cause very little trouble, as the speeds of 7 and 8 knots seem to have been comparatively easily maintained. In places such as that in which the very thick ice described as of 25 feet in thickness was found—it consisting of very thick pack ice into which the ship had to charge—progress seems to have been not more than about 3 knots and sometimes even less. Considering that the voyage was carried out under conditions which were absolutely strange, the whole result was exceedingly gratifying to the designers of the vessel and all who were connected with her construction. During the progress from Tolbeacon Light into the harbour the ship was accompanied by thousands of people in sledges, and the colone of a regiment, who is a great friend of Admiral Makaroff, marched out with sixty of his men on "ski" to meet the vessel on arriving at the lighthouse.

Her next trip was from Cronstadt to Revel, which took three days; the ice was found to be 20 feet thick, and nine frozen-in steamers were released. These vessels were convoyed out to sea by the "Ermack," and she then brought into port others which were lying outside the ice.

Each propeller has a set of main engines of the triple-expansion type for driving it when the full power has to be exerted. At the side of the shafting of each screw there is a pair of ordinary compound engines which drive the propeller by tooth gearing. The cylinders of the main engines are 25½ inches, 39½ inches, and 64 inches in diameter by 3 feet 6 inches stroke. These engines are of ordinary design, having high-pressure piston valves with steam inside. The other valves are of double-ported flat type. All the working parts are of steel and the pistons are of cast steel. The crank shafts are in two pieces 13¼ inches in diameter. The tunnel shaft is 12¾ inches in diameter, and the tail shaft 14½ inches in diameter. The boilers are double-ended, and six in number, 15 feet in diameter and 20 feet 6 inches long. There are two funnels 90 feet high and of 11 feet 6 inches outside diameter and 10 feet 6 inches inside diameter. The grate area is 800 square feet, while the heating surface is 27,600 square feet total. The propellers are all made with nickel steel blades containing 3 per cent. nickel, having a tensile strength of 40 tons; the stern propellers are 14 feet in diameter, the wing propellers being 14 feet 6 inches pitch, and the centre propeller 14 feet pitch. The forward propeller is 13 feet in diameter and is 13 feet 6 inches pitch. All are four-bladed, the blades being enormously thick, and with the very strong steel are

calculated to be brought up by ice without breaking when running at full speed. The machinery is all designed to withstand this test. The draught of the vessel is calculated at 19 feet in fresh water, having 300 tons of dead weight on board. This is the light draught which is designed for going into St. Petersburg. The draught of the ship working into the Kara Sea with 3,000 tons of dead weight will be 25 feet. The total capacity of the ship to the upper deck is 14,783 tons; of this 3,900 tons may be taken as coal in the coal bunkers, and in the cargo spaces together if required. In the latter there is room for close on 113,000 cubic feet of cargo. The vessel is divided into 48 water-tight compartments, of which 14 are in the double bottom. There is one cross bunker for coal, as well as side bunkers. The fore and after peaks are arranged for trimming purposes, so as to bring the vessel by the head or stern with water ballast. There are also two heeling tanks amidships. There will also be amidships an anti-rolling tank. We are not aware whether this was fitted before the ship sailed, but arrangements had been made for its construction at the time of the trial; it was to hold 100 tons of water if needed. It is not desirable to fit bilge keels to ice-breaking steamers, and for this reason the anti-rolling tank is more necessary. Model experiment has shown that, with 40 tons of water, the amplitude of rolling can be reduced 7 per cent. on each roll.

The pumping arrangements for the ship are of an exceptionally complete description, and have been specially designed to suit the various compartments into which the vessel is formed. The pump-room is a central compartment, perfectly water-tight, let into the middle of the vessel; being in fact, a well which descends to within 7 feet of the bottom. In the compartment thus formed there is on the main deck, and therefore 3 or 4 feet above the water-line, a donkey boiler, which is of the ordinary two-furnace return-tube type. On the same deck, and in an adjoining compartment, is the electric light machinery, so that even if the main boilers of the ship were out of use, the electric light machinery could be run. The salvage pump has a capacity of 10 tons of water per minute, and it is situated in the well already referred to, so that if the ship were flooded above the level of this pump, the latter would be still accessible and capable of being worked. There is, in connection with this pump, a main drain running right from end to end of the ship as in war-vessels; by means of this the fore and stern peaks can be made to interchange water, or the contents of either can be discharged overboard. There is a gauge in the salvage well which shows exactly what the fore and aft trim of the ship is, the indication being obtained by means of pressure due to the head of water. The salvage pump is in communication with the different compartments of the vessel, so that, if necessary, any list due to the presence of water on one side of the ship can be corrected. There are also connections by which the draught of the ship can be altered by filling or emptying the ballast tanks. It is anticipated that this means of altering the trim of the ship will be of great use in working her through ice or for releasing her from field ice. There is also another function of the same nature performed by this ballast pump. It is arranged so that it can take hot water from the boilers and pump it into the fore peak, the hot water overflowing through valves in the bow and running down the outside of the skin-plating. Vice-Admiral Makaroff is of opinion that this will prevent rough ice adhering to the vessel. This ice might otherwise accumulate, the collection of smaller pieces in this way often being a most formidable obstacle to a ship's progress.

There is a feed surface heater and a pressure filter in each engine-room. The engines are jacketed in a special way to prevent them from freezing up; low-pressure steam only is used for this purpose, the jackets not being specially intended for the usual purpose for which they are designed of giving economy in working, and being, it is believe, not used in running. There are no brass liners to the propeller shafting, the bearings being in white metal, and there is a stuffing box between the stern post and the propeller boss on the Cedervall

principle. This is fitted, because oil lubrication is used for the after bearing, and it is necessary to keep the lubricant which is pumped in from escaping. It may be added as a point of interest in connection with the discussion that took place recently at the Institution of Naval Architects that disconnecting the main engines from the line shafting and coupling up the auxiliary engines through their gearing occupied twenty minutes. The bolts in the collars of the shaft are withdrawn by an arrangement of gearing which operates all bolts at once—an arrangement which appeared to work excellently during the trial.

The machinery for this interesting vessel was supplied by the Wallsend and Slipway Engineering Company, having been designed under the superintendence of Mr. Andrew Laing, the general manager of the company. Great ingenuity has been shown in this department in solving the many difficult problems that were presented in the complicated arrangements of the machinery, not only on account of the multiplicity of the engines, but also on account of the exceptional strength that they should have in order to fit them for the trying work they will have to perform.

The double bottom of the ship is on the longitudinal system as usual, but is carried well round the turn of the bilge until it meets the wing coal bunkers These coal bunkers are carried up to the main deck, widening as they ascend, their tops, formed by the main deck, being 27 feet above the flat keel plate. On the main deck are a number of cargo spaces, each forming a water-tight compartment.

Vice-Admiral Makaroff, before the vessel was built, had a model made to scale, each compartment being represented by a water-tight box, so that by removing one or more of these boxes he could find out what would be the effect of filling them with water. The centre of gravity of each was found by experiment. If all compartments on one side of the ship were filled with water, she would heel to 70°, but had a margin of stability yet left due to the central compartments. If, on the other hand, all the main compartments containing engines and boilers (and the machinery space runs from end to end of the ship) were filled, the vessel would be kept afloat by her wing passages and cargo spaces, and would have 6 inches of freeboard still left.

Reference should be made to the arrangement for coupling up this ship with another vessel or vessels in order to make a train of ships for more effectually dealing with thick ice. Although the "Ermack" is so big and strong a ship, there is, of course, a limit to her capacity of breaking up ice and to the speed with which she could perform the operation. A vessel pushing astern of her, therefore, would supply additional power for the work. Forward the stem is set at an angle of 70° from the vertical. In going through ice she would slide up, raising her bow, and this would cause the ice to break down. She might, of course, mount the ice until her forward propeller came in contact with it; but, as has been said, this is made of sufficient strength to withstand the shock. That, however, is not what is expected generally to occur, as the form of the bow is designed to keep breaking down the ice continuously. Of course, this would absorb an enormous amount of power; but if another vessel, either an ice-breaker or an ordinary steamer, were pushing astern, naturally the speed could be increased. Moreover, a steamer not so strongly built as the "Ermack" would be protected by following close behind her. For this reason a recess has been built into the counter.

This recess is designed to take the stem of the following vessel, arrangements being made for lashing the latter in firm contact with the leading craft. There is a massive eyebolt at the stern, while the exceptionally strong bollards on each quarter would be used for attaching bridles, and the whole can be hove up by windlasses. It may be here mentioned that the "Ermack" has a special towing windlass aft, which was tested very thoroughly on the trials. There is another of the strong eyebolts or fair leads forward, as well as a special windlass, so

that the "Ermack" might be coupled up to a sister ship arranged in the same way. Whether with such a powerful means of breaking through ice Vice-Admiral Makaroff will ever be able to reach the North Pole we will not venture to speculate; but certainly, if the feat is ever to be accomplished, it is brought far nearer by the advent of these ice-breaking steamers than it has ever been before. We cannot either say whether the admiral hopes to compass this crowning feat of exploration, almost the last left for man to accomplish, the ambition of navigators for centuries, and in the endeavour to accomplish which so many lives have been lost.

The ship was built for the Russian Government on the advice of the Minister of Finance, and under the inspection of a Government commission, of which Vice-Admiral Makaroff was the president, other members being Captain Ouspensky, Russian Naval Attaché in England; Captain M. P. Vassiliev, of the Imperial Russian Navy; Colonel Poretchkin, of the engineering staff; and Captain Petroff, also of the engineering staff of the Imperial Russian Navy.—*Scientific American* and *Engineer.*

UNITED STATES.—*The New First-class Battle-ship "Maine."*—The following are the dimensions and particulars of the new first-class battle-ship "Maine":—

Hull.

Length on load water-line	388 ft. 0 in.
Length over all	393 ,, 9 ,,
Beam, extreme	72 ,, 2½ ,,
Freeboard, forward	20 ,, 0 ,,
Freeboard, aft	13 ,, 3 ,,
Freeboard, amidship	20 ,, 3½ ,,
Mean draught, with 1,000 tons coal and all stores and ammunition	23 ,, 10¼ ,,
Corresponding displacement (trial)	12,500 tons.
Speed per hour in knots	18
I.H.P., with assisted draught	16,000
Mean draught, will all provisions, stores ammunition, and 2,000 tons of coal on board ...	25 ft. 6 in.
Corresponding displacement	13,500 tons.

Armament.

Main battery	Four 12-in. B.L.R. Fourteen 6-in. R.F.
Secondary battery	Twenty 6-pr. R.F. Six 1-pr. R.F. Four Gatlings One field-gun
Height of axis of forward 13-in. guns above the 23 ft. 10¼ in. L.W.L.	26 ft. 1½ in.
Height of axis of after 13-in. guns above the 23 ft. 10¼ in. L.W.L.	18 ,, 7½ ,,
Mean height axis 6-in. guns main deck above the 23 ft. 10¼ in. L.W.L.	15 ,, 0 ,,
Mean height axis 6-in. guns upper deck above the 23 ft. 10¼ in. L.W.L.	22 ,, 4½ ,,

Armour.

Water-line belt, thickness amidships:—	
To 1 ft. below 23 ft. 6 in. L.W.L.	12 in.
Bottom	8½ ,,

Height above 23 ft. 6 in. load line	3 ft. 6 in.
Total depth of belt	7 ,, 6 ,,
Side armour above main belt, thickness ...	5½ in.
Superstructure armour ,, ...	6 ,,
Turret armour (13-in. guns) ,, ...	17 and 15 in.
Barbette armour ,, ...	15 and 10 ,,
Protective deck armour ,, ...	2¾ to 4 ,,
Conning-tower armour ,, ...	10 in.

General Schedule of Weights.

Hull and fittings	4,836 tons
Armour and bolts	2,933 ,,
Protective deck armour	600 ,,
Armament and ammunition	1,058 ,,
Machinery, with water	1,396 ,,
Equipment	199 ,,
Outfit and stores	478 ,,
Coal	1,000 ,,
Total	12,500

Machinery.

Vertical, inverted-cylinder, direct-acting triple-expansion engines, in two water-tight compartments.

Collective I.H.P. of propelling, air pump, and circulating pump engines	16,000
Number of revolutions at this power	126
Diameter of high-pressure cylinder	38½ in.
Diameter of intermediate cylinder	59 ,,
Diameter of low-pressure cylinder	92 ,,
Length of stroke	42 ,,
Cooling surface, main condenser	9,600 sq. ft.
Cooling surface, auxiliary condenser	800 ,, ,,

Boilers.

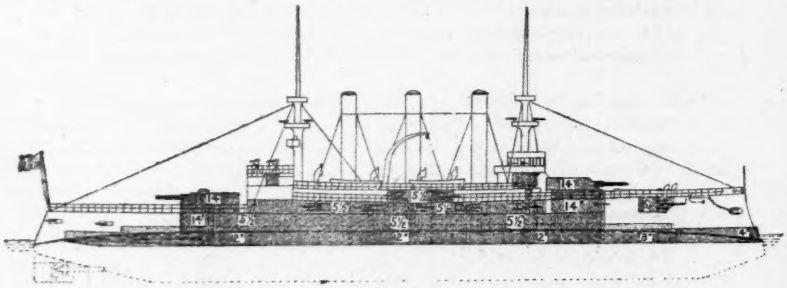
Will consist of 24 Niclausse water-tube type, arranged in three groups of 8 boilers each. Each group is sub-divided by the centre line bulkhead. Each boiler will have fifteen elements of 24 tubes, the whole number of elements being 360, and the number of tubes 8,640.

Total heating surface	58,104 sq. ft.
Total grate surface	1,353 ,, ,,

The boilers are designed to carry a working pressure of 250 lbs. per square inch above the atmosphere.

In the three battle-ships of this type, the "Maine," "Ohio," and "Missouri," we shall have fighting-ships at once the equals of anything abroad, and reflecting credit upon our naval advancement. To the persistent stand of Engineer-in-Chief Melville on the vital question of speed is the betterment of these ships over their predecessors, the "Illinois" and type, in the main due, and the increase of armament followed as a natural consequence upon the expansion of the original displacement of 11,525 tons.

The hulls of the ships are substantially similar to the "Illinois" type refined by the added length of 20 feet amidships. The inner bottom extends fore and aft throughout the major length of the vessels and reaches from the keel up to the lower edge of the armour belt, 4 feet below the normal load water-line of 23 feet 6 inches. This double-bottom space is divided into the usual water-tight sub-



PROFILE OF FIRST-CLASS BATTLE-SHIP "MAINE."

divisions, and is under the reasonable control of powerful pumps. The interior of the vessels is also well cut up by the usual water-tight sub-divisioning, which is likewise under thorough pumpage and drainage control.

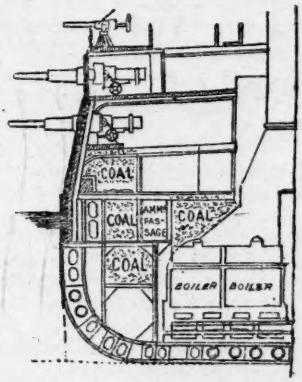
The ships have a freeboard forward of 19 feet and a freeboard aft of 11. The upper deck reaches from the stem aft to the after turret, and at the bow is flared out to a considerable extent. The main purpose is to make the ships drier in a head sea, but incidentally it affords ampler deck room for various purposes and more space on the deck beneath.

The details of the armour have not yet been finally determined, even though it has been decided that the armour shall be treated by the Krupp process, but there is every reason to believe it will remain practically as follows:—The side water-line belt be of armour having a maximum thickness of 12 inches for a depth of 4 feet, thence tapering to 8½ inches at the armour shelf 3½ feet below. This maximum thickness will reach from a line nearly abreast the forward end of the after turret to a point just abreast the after end of the forward turret, and thence will taper to 4 inches at the stem. The protective deck will rest flatly on the inner ledge of this water-line belt throughout the engine, boiler, and magazine spaces, and will be 2¾ inches thick, in two courses. Forward and aft of this region it will slope to the bow and to the stern. At the sides, aft, the deck will be 3 inches thick, amidships 1¾ inches thick, and forward the side slopes will be 2 inches thick, the armour of the water-line belt without making a greater thickness needless. The diagonal athwartship bulkheads at the extremities of the thickest part of the side armour will be 10 inches thick. The side armour above the armour belt and about the amidship battery of 6-inch guns will be 5¼ inches backed by two courses of ½-inch hull plating. The casemate armour on the upper deck and the protection about the two 6-inch guns on the main deck away forward will also be of 5½-inch armour.

The turrets and barbettes will have a maximum thickness of 14 inches. The original design submitted contemplated a distribution and thickness of armour similar to that on the "Illinois" type, and the present reduction is due to the superior defensive qualities of the plating treated by the Krupp process. A very considerable reduction in weight is thus secured, and it is not yet certain that more widespread protection will not be given to the hull just above the water-line belt. A cofferdam about 36 inches wide extends forward and aft to the bow and to the stern from the athwartship armour bulkheads in the space between the protective and the berth decks. It will be filled with briquettes of corn-pith

cellulose. On the berth deck there will be another cofferdam so filled and of like thickness. The efficacy of this cellulose belt has already been well established in actual conflict.

The ships will be propelled by two sets of triple-expansion engines actuating twin screws. These engines will be put in separate water-tight compartments. They will be of the three-cylinder, vertical, inverted-cylinder, direct-acting type, and the cylinders will be of 38½, 59, and 92 inches in diameter, with a common stroke of 42 inches. The high-pressure cylinders will be forward and the low-pressure cylinders aft. The collective I.H.P. of the propelling, air-pump, and circulating pump engines will be 16,000 when the main engines are making about 126 revolutions a minute.



MIDSHIP SECTION OF "MAINE."

Steam will be supplied by twenty-four boilers of the Niclausse water-tube type, constructed for a working pressure of 250 lbs. to the square inch, reduced to 200 lbs. on the steam pipes at the high-pressure cylinders. The boilers will be placed in four water-tight compartments, and there will be four fire rooms, two double and two single. The boilers will be arranged in groups of eight. There will be three funnels, the tops of which will be practically 100 feet above the grate bars. Blowers will be fitted for forced draught.

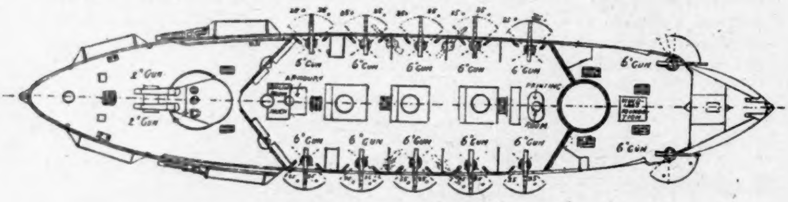
The coal-bunker capacity of 2,000 tons promises a very considerable radius of action in conjunction with the wholesale use of the more economical water-tube boiler; and at a cruising speed of 10 knots the ships will have an exceptionally fine reach of action.

The armament will consist of four 12-inch breech-loading rifles, sixteen 6-inch rapid-fire rifles, twenty 6-pounder, and four 3-pounder guns, and a couple of smaller pieces. The 12-inch guns, which will be of 40 calibres, will be of the new high-powered type designed to use smokeless powder, and with a muzzle velocity of 3,000 feet per second, and firing an 850-lb. shell, it will have the enormous energy of 48,000 foot-tons, equal to the penetration of 4 feet of solid iron at the muzzle. There will be a considerable saving in weight. These guns will be mounted in two elliptical, balanced barbette turrets, and will have arcs of fire of 280°. The sixteen 6-inch rapid-fire guns will be distributed four on the upper deck and twelve on the main deck. All will have wide arcs of fire, will carry heavy shields, and will be separated, one from the other, by splinter bulkheads 1¾ inches thick. Two of the 6-pounders will be mounted on the main deck just abaft the two bow 6-inch guns, four will be placed away aft on the berth deck, and the remaining ones up on the bridges and in the superstructure. The 3-pounders and the Gatlings will be mounted in the tops.

There will be two torpedo-tubes of an under-water type, and they will be located where they will be practically beyond the ordinary reach of shot or shell.

The ammunition supply will be a large one.

Electricity will constitute the motive energy for many of the auxiliary engines. It will run the ventilating blowers, it will hoist ammunition, turn and control the turrets, besides furnishing light within the craft and light without in the form of four search-lights and a double set of Ardois night signals.



Deck Plan of "Maine."

There will be a dense air refrigerating plant with a daily output equivalent to the cooling qualities of two tons of ice. There will be a distilling plant, consisting of four evaporators and two distillers, with their accessories, having a combined capacity of 8,000 gallons of potable water daily.

Wood will be used but sparingly, and, with the exception of the main deck, the upper deck, and the bridges, the decks will be covered with linoleum, rubber tiling, wire mats, or cement. Such wood, other than decking, will be carefully fireproofed; but wherever possible, light metal work will supplant wood altogether, unless in the shape of gratings and such things easily removed and thrown overboard before going into action.

It has been suggested that a comparison of the British "Magnificent" with these new ships might be interesting. The "Magnificent" is of 14,900 tons displacement, and has a battery of four 12-inch, twelve 6-inch, eighteen 12-pounders, twelve 3-pounders, and eight machine guns. The weight of our four additional 6-inch guns is somewhat accounted for in the "Magnificent" in the extremely powerful force of 12- and 3-pounder guns and their ammunition, which is an item of moment. At the same time, the armament of the "Maine" is unquestionably the heavier. The water-line armour of the British ship is only 9 inches thick, but it reaches up the sides to a height of 18 feet, and extends fore and aft for a distance of 220 feet. The "Maine," however, has a decided advantage in the fact that the water-line belt is continuous up to the stem. The casemate armour about the 6-inch guns of the "Magnificent" is 6 inches thick. The protective deck is 2½ to 4 inches thick, the athwartship bulkheads are 14 inches thick, maximum. The conning-tower is 14 inches thick, while the barbettes and barbette shields are 14 and 10 inches respectively. The coal supply is lighter by 156 tons, but the crew is composed of 757 persons, and the stores for the additional force are heavier. The ship makes about half a knot less speed than our ships, and, being a bulkier craft, to make that, her engines are heavier. Her boilers, too, of the Scotch type, are correspondingly weightier, and some of the structural accompaniments are of proportionate weight. The comparison shows how the most recent practices and our own system of hull protection yield certain savings of weight, which permit the weight of the defensive and offensive elements of the ship to be augmented to that extent.

The contract price for the "Maine" and her sister ships was 2,885,000 dollars, based upon the Cramps' bid.—*Scientific American.*

Trial of the Torpedo-boat Destroyer "Farragut."—The twin-screw torpedo-boat destroyer "Farragut," authorised by act of Congress, June 10th, 1896, the contract being signed by the Union Iron Works for her construction on October

6th the same year, has lately completed her official trials, and is reported as having developed extraordinary speed. On the builders' preliminary trial trip the "Farragut" made 31·76 knots under 404 revolutions of her propellers. The official figures are said to slightly exceed this achievement.

According to the report of Lieutenant-Commander F. J. Drake, president of the board appointed to conduct the trial of the torpedo-boat destroyer "Farragut" in San Francisco Bay, the result was as follows :—

"'Farragut' made successful trial run of one hour with one turn. Average revolutions, $419\frac{3}{10}$ per minute. Everything worked smoothly. Speed, 30·18 knots."

Under the contract the "Farragut" was required to make 30 knots, and naval officials are greatly pleased to hear that she exceeded the requirement.

On her return, in places where the water was deep, she made over 32 knots.

The trials of the "Farragut" have been closely observed by the people of San Francisco, and the wonderful speed of the curious craft has been satisfactory to everyone who loves the Navy and who notes the addition of a new protective machine with great interest. Her appearance upon the bay, while tearing along at full speed, was highly interesting. She cut through the water like a razor, raising scarcely any wave and leaving only a moderate swell behind.

The "Farragut" was launched on July 16th, 1898, and her cost to the Government was 227,500 dollars. She is the first destroyer completed and the speediest of her class yet built. The dimensions of the new torpedo-boat destroyer are :—Length over all, 213 feet 6 inches ; beam, 20 feet ; depth, 13 feet 4 inches ; and her draught is 6 feet. Ordinary displacement is 240 tons ; when in commission, her displacement is 270 tons. She will carry 85 tons of coal, sufficient for 2,000 miles at a speed of 10 knots.

The engines of the "Farragut" are four-cylinder triple-expansion and are rated at 5,600-H.P. The cylinders are 20 and 29 inches in diameter respectively, with two compressors 30 inches each. The stroke of her engines is 18 inches and the speed of her propellers 400 revolutions. The propellers are of composition, with three blades each, and are 6 feet 9 inches in diameter, with a pitch of 8 feet 9 inches. The boilers are the Thornycroft tubular, three in number, and 15 feet in length. Each has an area of 65 square feet and 4,020 square feet of heating surface, and are calculated for a pressure of 240 lbs. Amidships the sheathing is of 6-lb. boiler plate, at the extremities of 4-lb.

The armament of the "Farragut" will be powerful for a vessel of her size. It will consist of four 6-pounder rapid-fire guns and two 18-inch torpedo discharge-tubes. Two of the guns will be mounted on the forward platforms surrounding the conning-tower and two on the main deck. Her complement of men will be forty in number. The steering of the vessel, which was perfect in all her preliminary trials, is effected by a double-cyclinder engine secured in the bulkhead abaft the engines. There are altogether twenty-nine steam cylinders in the vessel. A test of the time required to raise steam in the boilers resulted very satisfactorily, and the easy maintenance of high pressure, even when at the highest speeds, was demonstrated.—*Scientific American.*

The Second-class Cruiser "Albany."—The protected cruiser "Albany," built for the United States Government by Sir W. G. Armstrong, Whitworth & Co. (Ltd.), at Elswick, Newcastle-on-Tyne, was launched on the 14th January last. The "Albany" is a sister ship of the "Amazonas," which the Elswick firm built for the Brazilian Government, and which was launched in December, 1896. Last year the "Amazonas," on her completion, was transferred to the United States flag, and, under the name of the "New Orleans," took part in the war with Spain. The "Albany" is of the following dimensions :—Length on the water-line, 330 feet ; length over all, 358 feet ; extreme beam, 43 feet 9 inches ; mean draught on a trial displacement of 3,500 tons, 16 feet 10 inches. She has a protected steel deck extending from stem to stern, and is fitted with 14 water-tight bulkheads

extending up to the berth deck. In addition to those divisions, she is fitted with a double bottom, minutely sub-divided into water-tight compartments; and the store rooms and coal bunkers below the protected deck are also water-tight. The armament of the "Albany" is as follows:—Six 6-inch, four 4·7-inch guns, ten 6-pounders, and four 1-pounders, all quick-firing. There are two machine guns for use in the boats and in landing and in the military tops. The vessel is fitted with two military masts, with two tops in each mast. The propelling machinery, which is being built by Messrs. Hawthorn, Leslie & Co. (Ltd.), at their St. Peter's Works, consists of two sets of triple-expansion engines, driving twin-screws, the maximum I.H.P. being 7,500, at 160 revolutions per minute, the guaranteed speed being 20 knots. There are four double-ended Scotch boilers. The vessel will be lighted by electricity, the plant consisting of three dynamos and engines.

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS DURING MAY, 1899.

Brevet Colonel W. Wood to be Colonel to command the 87th Regimental District. Colonel J. M. Babbington to be a Colonel on the Staff to command a Cavalry Brigade. Colonel J. A. Barlow from Assistant Adjutant-General in India, to be Deputy Adjutant-General in India, and to have the rank of Brigadier-General whilst so employed. Lieut.-Colonel and Colonel N. R. Stewart, I.S.C., to be Colonel on the Staff in India, and to have the substantive rank of Colonel in the Army. Brevet Colonel W. E. Hilliard to be an Assistant Quarter-Master-General in India, and to have the substantive rank of Colonel in the Army. Colonel J. F. Willoughby, Bombay Infantry, to be Major-General. Colonel (Brigadier-General) J. H. Wodehouse, C.B., C.M.G., to be Major-General. The following Lieut.-Colonels to be Colonels, viz.:—A. J. Price, C.M.G.; Chandos Hoskyns, R.E.; W. A. Collings; T. F. D. Bridge, R.M.L.I.; E. R. Hussey, R.E.; A. Porcelli, R.E.; J. Leach, R.A. H. Kilgour, Recruiting Staff Officer, Class I.; F. H. Plowden, Oxfordshire L.I.; H. C. Lamb, I.S.C.; and J. Deering, h.p. Colonel (Brigadier-General) R. C. Hart, V.C., C.B., to be K.C.B. Brevet Colonel A. H. Nourse to be Colonel to command the 2nd Regimental District. Colonel Sir W. P. Symons, K.C.B., to be Brigadier-General on the Staff to command the troops in Natal, and to have the temporary rank of Major-General whilst so employed. The following officers to be Major-Generals:—Colonel J. R. Slade, C.B., A.D.C. Colonel H. J. Hildyard, C.B., commanding 3rd Infantry Brigade, Aldershot.

HOME.—The War Office has detailed the troops which are to assemble on Salisbury Plain this year for drills and manœuvres. In comparison with last year these will be on a comparatively moderate scale. The drills or manœuvres are divided into four periods, and are as follows:—

a. Cavalry drills from 21st June to 19th July.
b. Artillery drills from 31st July to 12th August.
c. Infantry drills (1st period) from 26th June to 29th July.
d. Infantry drills (2nd period) from 31st July to 2nd September.

The drills will, this year, be under the supervision of Lieut.-General Sir C. Mansfield Clarke, K.C.B. The two cavalry brigades, consisting of six regiments of cavalry, will be under the direction of Major-General H. F. Grant, C.B., Inspector-General of Cavalry, and will be commanded and distributed as follows:—

1st Cavalry Brigade (6th Dragoon Guards, 12th Lancers, and 13th Hussars), Major-General J. D. P. French.

2nd Cavalry Brigade (a composite regiment of Household Cavalry, 1st (Royal) Dragoons, and 10th Hussars), Colonel J. P. Brabazon, C.B., A.D.C., at No. 1 Camp, Westdown.

The artillery, under the supreme command of Major-General G. H. Marshall, R.A., will be accommodated at Westdown. The R.H.A. (4 batteries) will be commanded by Colonel W. L. Davidson, and the Field Artillery brigades (15 batteries) by Lieut.-Colonels H. H. Pengree, R.A., H. V. Hunt, R.A., P. C. Newbigging, R.A., and S. Watson, R.A.

The 1st Infantry Division will be encamped at No. 7 Perham Down, near Ludgershall, and the 2nd Infantry Division at No. 10, near Bulford. The 3rd and 4th Divisions will take up the same camping grounds on the expiration of the first period of training.

The troops selected are as follows :—

1ST PERIOD.

1st Division.—Major-General Sir H. Leslie Rundle, K.C.B., C.M.G., D.S.O., R.A.

1st Brigade.—Colonel M. W. Wilson, C.B., Scots Guards. Troops—2nd Bn. Royal Scots, 1st Bn. Highland Light Infantry, 3rd Bn. Royal Scots, 3rd Bn. Royal Scots Fusiliers.

2nd Brigade.—Colonel T. E. Verner, C.B., commanding 10th Regimental District. Troops—1st Bn. Suffolk Regiment, 1st Bn. West Riding Regiment, 3rd Bn. East Yorkshire Regiment, 4th Bn. Border Regiment, one squadron 10th Hussars.

Divisional Troops.—Lieut.-Colonel G. R. Challoner, R.A., 20th, 44th, and 83rd Field Batteries R.A., 8th, 34th, and 35th Companies A.S.C., No. 11 Field Hospital, and half No. 17 Bearer Company R.A.M.C.

2nd Division.—Major-General Sir W. F. Gatacre, K.C B., D.S.O.

3rd Brigade.—Colonel I. S. M. Hamilton, C.B., D.S.O. Troops—3rd Bn. Coldstream Guards, Royal Marine Light Infantry, 3rd Bn. Linc. Regiment, and 4th Bn. Linc. Regiment.

4th Brigade.—Colonel R. A. P. Clements, D.S.O., A.D.C., South Wales Borderers. Troops—2nd Bn. Dorset Regiment, 1st Bn. Berks Regiment, 3rd Bn. Leicester Regiment, 3rd Bn. Welsh Regiment, one squadron 10th Hussars.

Divisional Troops.—Lieut.-Colonel H. H. Pengree, R.A. 10th, 17th, and 59th Field Batteries R.A., 4th, 19th, and 33rd Companies A.S.C., 2nd Division Field Hospital, and half No. 17 Company R.A.M.C.

2ND PERIOD.

3rd Division—Major-General Sir H. L. Rundle, K.C.B., G.M.G., D.S.O., R.A.

5th Brigade.—Colonel M. W. Wilson, C.B., Scots Guards. Troops—1st Bn. Grenadier Guards, 2nd Bn. Scots Guards, 3rd Bn. Somerset Light Infantry, 3rd Bn. Middlesex Regiment.

6th Brigade.—Colonel H. S. G. Miles, M.V.O. Troops—2nd Bn. South Wales Borderers, 1st Bn. Oxford Light Infantry, 3rd Bn. Worcester Regiment, 4th Bn. Oxford Light Infantry, one squadron 10th Hussars.

Divisional Troops.—Lieut.-Colonel P. C. Newbigging, R.A. 4th, 38th, and 78th Field Batteries R.A., 8th, 34th, and 35th Companies A.S.C., No. 15 Field Hospital, and half No. 1 Bearer Company R.A.M.C.

4th Division—Major-General Sir W. F. Gatacre, K.C B., D.S.O.

7th Brigade.—Colonel Hon. F. W. Stopford, C.B. Troops—2nd Bn. Dorset Regiment, 2nd Bn. Manchester Regiment, 4th Bn. Manchester Regiment, 4th Bn. North Stafford Regiment.

8th Brigade.—Colonel R. A. P. Clements, D.S.O., A.D.C., South Wales Borderers. Troops—1st Bn. Northumberland Fusiliers, 1st Bn. Welsh Fusiliers, 5th Bn. Rifle Brigade, 7th Bn. Rifle Brigade, one squadron 10th Hussars.

Divisional Troops.—Lieut.-Colonel S. Watson, R.A. Troops—64th, 77th, and 88th Field Batteries R.A., 4th, 19th, and 33rd Companies A.S.C., 2nd Cavalry Brigade Field Hospital and half No. 1 Bearer Company R.A.M.C.

A Blue-book has just been issued containing the preliminary return of the British Army (prepared in anticipation of the general annual return) for the year 1898, together with abstracts from the returns for the period between 1879 to 1898.

The return consists exclusively of statistical information, and the first table shows, by arms, the effective strength of the Regular Army on the first day of each month during 1898 and the average strength during the year. The average strength of all arms during the year was 225,027, which (as shown by table No. 7) is an increase of 5,744 upon the average strength in 1897, and an increase of 34,737 over that of 1879. The average strength of the different arms last year was as follows:—Household Cavalry, 1,305; cavalry of the line, 17,848; Royal Artillery—Horse 3,669, Field 14,932, Mountain 1,383, Garrison 18,326; Royal Engineers, 7,860; Foot Guards, 6,958; infantry of the line, 138,033; colonial corps, 6,312; Army Ordnance Corps, 1,373; Army Medical Corps, 2,835; Army Pay Corps, 580. By ranks this average strength was made up as follows:—Officers, 7,880; warrant officers, 923; sergeants, 14,435; trumpeters, drummers, and buglers, 3,494; rank and file, 193,295. The average strength at home was 102,202—75,432 in England, Wales, and the Channel Islands, 4,069 in Scotland, and 22,701 in Ireland; and abroad, 122,825—49,932 in the Colonies, and 72,893 in India. The effective strength on January 1st, 1899, was 231,851 of all ranks, and the number wanting to complete in rank and file was 848. On the corresponding date of 1898, the number of effectives was 212,393. During 1898 there was a total increase of 47,303 in the number of non-commissioned officers and men; 2,578 died, 12,983 were discharged, and there was a total decrease of 37,323, leaving a net increase of 9,980.

Of the recruits finally approved, 38,890 in number, 30,764 were raised in England, 3,950 in Scotland, and 4,176 in Ireland. During 1898, the total number of recruits who joined the Army was 40,701, and of these 1,530 were under 17 years, 212 under 18 years, 17,362 under 19; 8,538 under 20 years, 4,242 under 21 years, 2,738 under 22 years, 2,162 under 23 years, 1,313 under 24 years, 950 under 25 years, 193 were 25 years and upwards, and the age of 1,461 recruits who joined colonial corps is not reported. No fewer than 12,715 of these recruits stood 5 feet 7 inches and upwards, and 6,238 were under 5 feet 4 inches. The largest number of tall men were enlisted for infantry of the line—namely, 4,024, the Royal Artillery being next with a total of 3,200, the Foot Guards taking 2,197, and cavalry of the line 2,061. To the Household Cavalry 121 recruits were added, and of these 118 stood 5 feet 7 inches or more, the remaining three being under 5 feet 4 inches, and all but two weighed 130 lbs. and upwards.

The total number of men who re-engaged after service ranging from 9 to 12 years was 2,981, and 4,806 men originally enlisted for short service extended their engagements with the colours to complete various periods of service. In all 12,983 men were discharged, including 1,945 for misconduct and 3,683 invalids. The number of pensions granted was 2,773, 1,678 being permanent and 1,095 temporary. Table No. 19 relates to the number of desertions in 1898 from each arm of the Service, and shows that the proportion of net loss from this cause per 1,000 men was greater in the cavalry than in any other arm—namely, 18 per 1,000, the proportion 15 per 1,000 in the Foot Guards, 12 per 1,000 in the Royal Artillery, and 10 per 1,000 both in the infantry of the line and in the colonial corps. The Royal Engineers show the smallest proportion of desertions, while (according

to table No. 31) the number of men per 1,000 of average strength fined for drunkenness was greatest in the infantry—namely, 55 per 1,000. In the Household Cavalry only one man per 1,000 of average strength was fined for the same offence. The total number of men serving at home on January 1st, 1899, who were in possession of good-conduct medals and gratuities was 508, and 713 had similar medals without gratuities. In addition, 34,734 men were in possession of good-conduct badges. Of the non-commissioned officers and men serving at home at the same date, 79,001 were English, 8,890 Scotch, 12,578 Irish, 1,325 were born in India or the Colonies, 33 were foreigners, and the nationality of 262 is not reported.

Table 43 shows that the total number enrolled of all ranks in the Army Reserve, Militia, Yeomanry, and Volunteers was 433,163, and 56,851 were wanting to complete. On January 1st, 1899, the Army Reserve consisted of 78,798, and of these 45,059 were under 30 years of age.

A Royal Warrant, published in the Army Orders for June, orders that from the 1st June, 1899, the mounted and dismounted branches of the Royal Regiment of Artillery shall be separated into two corps, under the general title of the Royal Regiment of Artillery, to be respectively named :—

a. The Royal Horse Artillery and Royal Field Artillery.

b. The Royal Garrison Artillery.

The Royal Warrant, dated 28th January, 1899, defining "corps" for the purposes of the Army Act, will be amended accordingly. The honours and distinctions now borne by the regiment will be borne by each of the above-named corps. The names of the officers who have elected, or who have been selected, to serve with either corps will be published in the Monthly Army List, and they will then be considered as having been duly gazetted to their respective corps. Enlistments will in future be for service in the Royal Regiment of Artillery (Royal Horse and Royal Field Artillery) or in the Royal Regiment of Artillery (Royal Garrison Artillery). Men for the Mountain Artillery will be enlisted for the Royal Regiment of Artillery (Royal Garrison Artillery).

The service of officers in the Royal Regiment of Artillery will be subject to the following conditions :—

1. The selection of officers for promotion will in future be made from the list of officers of the corps in which the vacancy has occurred.
2. Exchanges between officers of the two corps may in certain cases be permitted under regulations to be published hereafter.
3. Officers now serving with the Garrison Artillery whose names have already been noted for transfer to the mounted branch, will be considered for such transfer as opportunities occur.
4. Officers appointed to either corps after 1st June, 1899, will have no claim to be considered for transfer.
5. Appointments to the Royal Horse Artillery will be made exclusively from the Royal Field Artillery.
6. Appointments to the Mountain Artillery (both European and Native) will be made exclusively from the Royal Garrison Artillery.

INDIA.—An Army circular, recently published, notifies a number of additions and corrections in the "Rules for Press Correspondents at the Seat of War." The amended rules are as follows :—

1. Officers and soldiers are prohibited from publishing, or communicating to the Press, without special authority, either directly or indirectly, information relative to numbers, movements, or operations of the troops, or detail regarding fortifications, armaments, or experiments made in connection with military matters. They are not to attempt to prejudice questions under investigation by the publication, anonymously or otherwise, of their opinions.

2. No officer belonging to the army in the field will, o any account, be permitted to act as newspaper correspondent, nor shall a correspondent be employed in any military capacity with the force.

3. Officers not belonging to the army in the field will be eligible, in special cases, for appointment as correspondents, but, as a rule, civilians only will be appointed. All correspondents must be furnished with a license under the authority of the Commander-in-Chief. In this license, the paper, or papers, or newsagency, for which the correspondent is agent, will be stated.

4. A correspondent may not write for papers other than those mentioned in this license. If he desires to do so, he must get leave, and the permission must be duly registered on his license.

5. Licenses will only be granted to those whom it is considered desirable to have as correspoadents in the field. Only one correspondent will be allowed for each newspaper.

6. All correspondents in the field will be under the Army Act during their stay with the Army.

7. Correspondents will not be allowed to go to the outposts without special permission, to be granted in writing each time a correspondent may wish to visit them.

8. The use of any cipher is forbidden to correspondents.

9. A staff officer will be named to supervise all Press matters. He will register all licenses and grant passes when necessary to all correspondents at the seat of war. He will be the channel of communication between the General Commanding-in-Chief in the field and the correspondents. Each newspaper having a correspondent in the field, or at the seat of war, will send this staff officer a copy of every issue of their papers, so that he may, by examining their contents, be assured that the Press rules in the field are strictly adhered to.

10. All communications from correspondents to their newspapers or newsagencies must be sent through, and be countersigned by, this staff officer, and he may detain or alter the communication should he deem it injurious to the interests of the Army.

11. The military authorities will give correspondents as much information as they may consider advisable and consistent with their duty. The above-mentioned staff officer will fix an hour when correspondents may call upon him daily for information, and he will be authorised to tell them everything that can be published with safety to the Army.

12. The military authorities will facilitate, so far as they can, the despatch of messages of correspondents.

13. Should the means of communication at the disposal of the General Commanding-in-Chief in the field not be sufficient to convey the messages of correspondents, the latter may, under his sanction, arrange for special means of transmitting their messages. It is, however, to be clearly understood that such arrangements are to be entirely under the control of the staff officer previously mentioned.

14. The General Commanding-in-Chief in the field has power to revoke, at any time, any license granted under the authority of the Commander-in-Chief, should he consider it advisable in the interests of the Army to do so. Correspondents are to be warned that any messages despatched, either from the field telegraph office, or elsewhere, without the countersignature of the staff officer, mentioned in paragraph 9, will involve immediate withdrawal of the license.

AUSTRIA-HUNGARY.—The Military Technical Committee have been lately experimenting with a new field artillery *matériel*, which, according to the *Armeeblatt*, includes two kinds of steel guns, viz., one a Q.F. piece with a calibre of 7 centimetres, and a gun with a curved trajectory, otherwise a field Howitzer of 12 centimetres.

The batteries when formed will probably consist of six pieces, with the Q.F. guns on the one side and the Howitzers on the other. In the military world it is thought that the batteries with Q.F. guns will be divided amongst the divisions, and that the Howitzer batteries will form the corps artillery.

The Austrian paper adds that the trials made with this new *matériel* by the Military Technical Committee are on the point of being concluded. In any case, several years will elapse before the War Minister will obtain the necessary credits for the manufacture of this new *matériel*, and before the troops will be provided with it.

The Austro-Hungarian Press announce that motor cars will be used during the grand manœuvres of the 8th and 9th Army Corps, which will take place this year in the north of Bohemia. These cars will be used for carrying the provisions for the troops, which they can do with greater rapidity than the ordinary regulation transport.

A co-operative society for the benefit of military and naval officers is on the high road to being organised. The object of this institution (*Offizier-Verein*) is to procure, as cheaply as possible, for officers of the Army and Navy, as well as for their families, various indispensable articles such as military and civilian clothes, equipment, saddlery, linen, food, wine, furniture, etc. In addition, members of the association will benefit by various other advantages, amongst others, reduction in hotel charges, theatres, etc. To develop the spirit of *camaraderie* and to facilitate the relations between officers the co-operative society will have a paper (*Vereinsblatt*), which will insert gratuitous advertisements asking for employment as well as military and legal news. The funds realised will be utilised for the assistance of officers' widows and orphans. The direction of the association is entrusted to a general of division, assisted by two generals of brigade and several other most competent specialists.—*Revue du Cercle Militaire.*

BELGIUM. — The *Belgique Militaire* announces that in consequence of successful experiments conducted by the manufactory of preserves at Anvers, the composition of the reserve rations called the "*vivres du sac*," will be modified in the following manner :—

The biscuit will be replaced by a similar but more friable production, with a more agreeable taste and containing a larger quantity of nutritive matter. The aluminum boxes which contained the rice, coffee, pepper, and salt will be done away with; a "*cartouche alimentaire*" will be substituted for them, containing a tablet of desiccated salt, a tablet of compressed coffee, chicory, and sugar, a tablet of pulverised pease-meal and meat. These three tablets are wrapped in waterproof paper, enclosed in an aluminum case of cylindrical shape, 2 inches long and 1½ inches in diameter. Each of these cases thus represents, with the 1½ lbs. of biscuit, the equivalent of a reserve ration. In the event of mobilisation each man would receive, according to orders, one or more of these reserve rations.

BRAZIL.—The Army of the Republic, after having recently undergone several most practical modifications, is now as follows :—

Infantry.—40 battalions of four companies each, and an effective of 425 men, and the following officers, viz. :—2 superior officers, 5 captains, and 14 lieutenants or sub-lieutenants.

Cavalry.—14 regiments of 4 squadrons.

Artillery.—6 regiments of field and 6 battalions of garrison artillery, each consisting of 4 batteries.

Engineers.—2 battalions of 4 companies.

Military Train.—2 squadrons.

The field artillery is armed with the 7·5-centimetre Krupp gun; the infantry has received the 7-millimetre Mauser rifle, the cavalry the carbine of the same type; men armed with the lance or sword are provided with the Belgium Nagaut revolver; the officers prefer the Girard model.—*La France Militaire.*

FRANCE.—The following memorandum from the Minister of War to commanders of army corps, was recently published in the *Progrès Militaire,* viz.:—

"It has frequently been stated that cavalry officers seldom find the opportunity, during manœuvres, of being exercised in reconnaissance duty, under conditions which approach the circumstances of war from the point of view of distances to be traversed.

"The fact therefore should not be overlooked that these officers should be placed as frequently as possible in a position to exercise and develop those indispensable qualities which will fit them to properly fulfil such an important portion of their *rôle* in the field, some of these qualities necessitating a physical training, which it is advisable should not be neglected.

"I have therefore been led to think that it would be of very great advantage to cause a reconnaissance of long duration to take place in each regiment of cavalry.

"These reconnaissances would have for their object the preparation of officers for their *rôle* of reconnoitring by making them cover longer and longer distances, and of giving them the opportunity of observing troops manœuvring or on the march. To this effect they would be carried out in the direction of zones, fixed beforehand, where they would meet troops of another garrison either manœuvring on their parades or on open ground, or else executing garrison manœuvres or even a simple march.

"To arrive at this result, it would suffice that in consequence of a previous understanding, commanding officers of cavalry should be advised, at the proper time, as to the points on which they might direct the reconnaissances.

"Officers sent on reconnaissance should be ordered to reconnoitre troops, without being seen, and to transmit or report the information gathered (strength and composition of the troops, direction of their march, etc.).

"These officers should be accompanied by a non-commissioned officer and by one or two privates, who might be replaced by a cyclist.

"The duration of these reconnaissances should be for one or two days, they may even last for three days, and should be calculated in such a manner that the distance covered in twenty-four hours should be at least from 60 to 80 kilometres.

"Exercises of this nature are already executed, with great advantage in some army corps, and I have the honour to beg you to take such steps as you may think proper, in order that they may be put in practice, if they are not so already, in the cavalry corps under your command.

"Officers and men taking part in these exercises will be entitled to the daily indemnity provided for by No. 2 regulation of the 15th December, 1898, for reconnaissances; a representative indemnity for forage will be drawn for each horse.

"The expenses which result will be supported by the funds which were granted you by my despatch of the 24th January, 1899, for garrison manœuvres.

"In the event of the insufficiency of these funds, I place at your disposal, in addition, under the same heading (chap. 32, Garrison Manœuvres), a supplementary 300 francs for each brigade of cavalry.

"You will be good enough to send me, with the account for the garrison manœuvres, a brief report of the cavalry reconnaissances carried out in the district, adding any personal observations you may think necessary.

"C. DE FREYCINET."

The formation of two cyclists' companies by the 6th and 20th Army Corps has been decided upon. Each of these units will be composed as follows, viz. :—

1 captain commanding, 4 lieutenants or sub-lieutenants, 1 responsible non-commissioned officer, 1 assistant non-commissioned officer, 4 sergeants, 8 corporals, 2 buglers, 4 machinists, 100 men, or a total of 5 officers and 120 N.C.O.'s and men.

In each of the above-named army corps, the cyclist unit will be formed by men selected from all the corps, and attached for discipline to one of the Chasseur à pied battalions of the district. The officers will be simply seconded for this duty.

With the exception of the flat woollen cap, the uniform of the company will be similar to that of the Alpine Chasseurs ; the men will be armed with the artillery carbine and bayonet. The company of the 6th Army Corps will be quartered at Saint-Michiel, that of the 20th Army Corps at Lunéville.

The composition of these two units will take place very shortly, as they will take part in the grand manœuvres this year.—*Revue du Cercle Militaire.*

The 9th Regiment of Hussars have just completed some exercises, which deserve to be recorded, at Cadenet, on the Durance. This rapid and hitherto virgin river was crossed in a manner as daring as it was skilful. The rafts which were used for the transport of the regiment from one bank to the other of the Durance, are of waterproofed silk, and recall the mussacks used on the Pacific coast and in India. They are exceedingly useful and practical for assisting small cavalry or infantry groups to cross a river with despatch, when the normal means of crossing are destroyed or in the possession of the enemy. Each of these bags weighs about 13 lbs., and when required for use are distended by filling them with branches of wood, straw or dead leaves, and when tied together they form rafts capable of being navigated. They are provided with rings and life-lines, and will easily support a dozen men or the harness equipment of a complete troop. A squadron passed from bank to bank in 20 minutes, the distance across the deep and dangerous stream being 80 metres, together with a considerable stretch of shallow water of about 800 metres.—*La France Militaire.*

The following military race meetings for the months of June and July at Vichy are announced by the *Revue de Cavalerie* :—

CONCOURS HIPPIQUE DU SUD-EST.

At Vichy (Hippodrome de Sichou). From Friday, 23rd June, to Sunday, 2nd July, 1899. Military meeting. Prizes consist of Gold Medals. Officers' chargers borne on the rolls of regiments, quartered in the district, and ridden by Officers of the Cavalry of the Line, of the Reserves, of Light Cavalry, or other branches of the Service, on the Active List, in uniform, and belonging to these regiments.

PRIX DES RÉGIMENTS.

Twice round the course, at least eight obstacles.

1st Section.

Horses ridden by Officers of the Cavalry of the Line, of the Reserve, or other branches of the Service. Four prizes, value 100frs. each 400frs

2nd Section.

Horses ridden by Officers of Light Cavalry. Four prizes, value 100frs. each, 400frs.

Total ... ... 800frs.

The President and Committee have the power to transfer prizes from one section to the other, according to the number of horses starting.

PRIX DE CIRCONSCRIPTION.

Three times round the course, at least twelve obstacles.

Three prizes, value 200frs. each ... ... 600frs.
Four prizes, value 100frs. each ... ... 400frs.

Total ... . 1,000frs.

PRIX DE CLÔTURE (HANDICAP).

First prize, value 300frs.; Second prize, value 200frs.; Third prize, value 100frs. Fourth prize, value 100frs. ... ... Total 700frs.

Grand Total ... 19 prizes, value 2,500frs.

GERMANY.—The *Neue Preussische Zeitung* announces that arrangements will shortly be made for two companies from two regiments of each army corps carrying out long trial marches, especially in the summer, with a view to undertaking experiments with regard to the working of sugar as a nutritive. On the march, the more intelligent men of these companies will be issued plain sugar, and pastilles of sugar flavoured with coffee or lemon, which will be dissolved in water carried in the tin water-bottles, in order to find out if fatigue may be more easily borne by their means.

The *Militär-Wochenblatt* gives a description of a portable acetylene field search-light, the invention of First Lieutenant von Kries of the German Guard Military-Train Battalions. It is intended to be used at night in searching for the wounded on the battle-field. The acetylene developer may be carried on a man's back and produces a supply of gas capable of maintaining, for eight hours, a light of from 50 to 60 candle-power. The light with a reflector is placed on an upright rod, which forms a pivot upon which the light can be turned in any direction. The effective radius is from 80 to 100 metres. A metal tube connects the light with the developer. The latter works automatically and all danger of explosion is fully guarded against.

The new rifle is, as the Minister of War, von Gossler, announced to the Reichstag, of the same calibre as the old one, and will only be given out to the troops as the latter becomes unserviceable. One of the chief faults of the rifle now in use is the result of the way in which the cartridges are introduced into the magazine, and even of the arrangement of the latter. As is known, cartridges are now introduced, five at a time, into the magazine and fitted on to a loader; after the five shots have been fired, the loader falls out at the base. The laying of these five cartridges one on the top of the other necessitates the magazine being of such a height that the bulk of the latter exceeds that of the stock towards the butt. This prominence of the magazine inconveniences the firer, and gives an awkward appearance to the rifle. The necessity of leaving the magazine open at the base, to allow for the ejection of the loader, results in inconvenience, caused by the penetration of sand, dust, and damp into the rifle. A loader of a different model has been found: it is a plate with two rims or grooves—a framework loader—which holds the cartridges, and from which they are automatically removed without the loader penetrating the magazine. Further, the magazine allows for the placing of the cartridges in quincunx or zigzag; the magazine is therefore no longer necessarily open at the base, and becomes, in addition, sufficiently low not to interfere with the stock. This modification is due to the celebrated manufacturer of the Mauser rifle.

Another modification consists in the suppression of the cradle. The rifle barrel lies at present in a cradle, from which it is separated by a small space. The idea of this construction was that the heating of the rifle would be thus retarded. This cradle has now been replaced by a wooden hand-guard, similar to one now in use in the Austrian and Swiss Armies, and as a result, the weight of the rifle is slightly decreased. The backsight is graduated up to a range of 1,200 metres and has been improved in such a manner as not to mask the view of objects at short distances, as is the case with the backsight of the present rifle.—*Internationale Revue über die gesammten Armeen und Flotten.*

The *Berliner Tageblatt* gives the following details of important modifications in the mobilisation service in Germany. Each reservist was informed by letter that he must present himself at the police station of his district, or in villages at the communal office, on the 30th or 31st March, with the object of being presented with a "field order" (*Kriegsbeorderung*), which must be pasted into his military small-book. This order informs each reservist that he is obliged, in the event of mobilisation, to report himself on the 1st, 2nd, or 3rd day, at such and such an hour, at the headquarters of a certain regiment, to which he is attached. The general directions printed on the back of this document point out that the order to mobilise is communicated to each district by telegram, by posters, and through the medium of the newspapers.

The expenses of the change from one place to another are adjusted on his arrival at his corps. The men who are mobilised have the right to make use of all trains that may be leaving, as well as of all available classes, by simply showing their military small book. They must provide themselves, on their departure, with provisions for one day, as well as with packing paper for the return of their civilian clothes, etc. They should provide themselves, between the 1st October and the 31st March with woollen underclothing, for which they will be reimbursed. They should, as far as possible, be furnished with a thoroughly strong pair of boots, for which they will also be repaid.

The severest punishment will follow any infraction of these rules.

This "field order," which is printed on yellow paper, has to be presented to a proper authority each year, and is replaced by a fresh document, available also for one year. Great stress is laid on these innovations. Without having to wait for the order calling him out, the reservists at once know what to do in the event of mobilisation.

The directions are most minute for all—officers, non-commissioned officers, and soldiers. The smallest detail is mentioned, even to the number of the room where he must report himself.

The following regulations regarding French deserters in Alsace-Lorraine have recently been published by the German Government:—

1. Absolute prohibition for every French deserter to take up his residence in Alsace-Lorraine. Formerly deserters finding occupation were permitted to reside in the two provinces without any special authorisation.

2. Each inhabitant is bound to inform the mayor of the arrival of a deserter, as soon as he is aware of it.

3. Each deserter should, immediately on arrival, be disarmed and clothed in civilian garments, for which, if he has the money, he must pay, or if he is without means, must be given to him. He should be reconducted the same by rail to the part of the frontier he may choose, or else to a town in the centre of Germany, where he will be placed under surveillance.

4. Each French deserter surreptitiously returning to Alsace-Lorraine, after being expelled, will be liable to the penalties, adjudged by the High Court, for treason or espionage.

ITALY.—The following table from the *Militär-Wochenblatt* shows the number of officers of the various branches of the Service, on the active list of the Italian Army:—

Branches of Service.	Maj.-Genls.	Colonels.	Lieut.-Cols.	Majors.	Captains.	Lieutenants.	Sub-Lieuts.	Total.
Carabiniers	—	8	16	32	136	288	93	573
Infantry	—	141	271	429	2,248	3,487	831[1]	7,407
Cavalry	—	26	37	56	258	457	125	959
Artillery	—	53	69	127	580	737	148	1,714
Engineers	—	25	29	75	166	286	46	627
District Commands ...	—	30	26	33	168	56	—	313
Fortress Staff	—	3	4	11	23	21	—	62
Pensioners	—	—	—	1	3	6	1	11
Medical Department ...	2	16	28	17	286	166	91	606
Commissariat	—	4	15	27	119	129	18	312
Pay Department	—	1	13	48	338	693	52	1,145
Veterinary Department ...	—	1	2	10	60	99	16	188

On the active list are also 57 lieut.-generals and 87 major-generals altogether.

[1] Ninety-seven of these are bandmasters with the rank of sub-lieutenant.

NORWAY.—A new uniform is about to be adopted by the Norwegian infantry. According to the *Progrès Militaire*, the dress is very similar to that worn by the civil population. It is characterised by the suppression of the military great-coat; this is replaced by a sleeping sack and by a woollen jersey. The sack weighs about 3¼ lbs. When going to sleep, the man can draw it up to his ears and can then close it by means of a running cord. The jersey is very thick and comes down to the hips; it weighs rather over 2 lbs. The soldier wears it in bivouac and under his tunic in very cold weather. The knapsack is replaced by a valise, similar to that worn by tourists. The body is made of thin wood and has two uprights in the shape of the letter S, joined at the upper part by a brass lining. The height of the valise is about 18 inches and the width 16 inches, its weight about 3 lbs. It is large enough to contain easily all a soldier's equipment, including the sleeping sack, the woollen jersey, two days' rations, shoes, and other regulation necessaries. It is closed at the top by a cap and strap. On each side there is a cartridge pocket. When carried by the soldier, the knapsack rests on the hips, and the straps that go over the shoulders only help to keep it on the back.

RUSSIA.—The *Rouskii Invalid* gives details of the troops taking part in the various district manœuvres:—

1. In the St. Petersburg District, the manœuvres will take place in the neighbourhood of Tsarskoé-Selo, Peterhof, and St. Petersburg, and will last for 10 days; all the troops assembled at the camp of Krasnoé-Selo will take part in them, viz.: 60 battalions, 49 squadrons or sotnias, and 41 batteries, belonging to the Guard, and to the 1st Army Corps.

2. In the Vilna District the 2nd and 3rd Army Corps and the 5th Brigade of Chasseurs (70½ battalions, 35 squadrons or sotnias, and 36 batteries) will execute a combined attack for five days, in the middle of August, representing the final phase of the march-manœuvres which will precede it.

3. In the Varsovie District, at the end of August, manœuvres will take place in the neighbourhood between Varsovie and the Vlotslavsk-Kouine line. The troops taking part belong to the 5th and 15th Army Corps, to the 1st and 2nd

Cavalry Corps, to the 3rd Infantry Guards Division, and to the Reserve troops of the fortified Varsovie District. Their effective will consist of 108 battalions, 112 squadrons, and 46 batteries.

4. In the Kiev District, in the middle of August, the 9th, 12th, and 21st Army Corps will execute march-manœuvres for a period of 20 days, which will conclude by a combined attack in the neighbourhood of Lipovets:—102 battalions, 76 squadrons, and 52 batteries will take part; a ballooning fortress section, lent from the ballooning instruction park, will take part in these manœuvres.

5. In the Odessa District, at the end of August, a five days' manœuvre will take place in the vicinity of Sebastopol, in which 40 battalions, 9 squadrons, and 12 batteries, belonging to the 7th and 8th Army Corps and the garrison of Sebastopol, will take part.

6. In the Moscow District, march-manœuvres, for a period of 14 days, in the Moscow-Toula-Riazan neighbourhood, will be executed by 57 battalions, 28 squadrons, and 34 batteries belonging to the Corps of Grenadiers, and the 17th Army Corps.

7. In the Caucasus, during the latter half of August, 54 battalions, 31 squadrons, and 24 batteries will take part in march-manœuvres in the Tiflis-Sarakamych-Ardahan neighbourhood.

NAVAL AND MILITARY CALENDAR.

MAY, 1899.

1st (M.) Details of Anglo-Russian Agreement, regarding China, published.

" " H.M.S. "Edgar" left Portsmouth for Malta, with new crew for "Royal Sovereign."

2nd (T.) H.M.S. "Crescent" commissioned at Portsmouth as flag-ship on North American and West Indian station.

3rd (W.) Launch at Pola of torpedo-aviso "Aspern" for Austro-Hungarian Navy.

" " H.M.S. "Forte" left for Cape and West Coast of Africa.

9th (T.) H.M.S. "Tribune" commissioned at Chatham for North America and and West Indies.

10th (W.) Russia demands concessions for a railway connecting Manchuria with Pekin.

13th (Sat.) 2nd Bn. Duke of Cornwall's Light Infantry left Devonport for Coryton and commenced their march through the county of Cornwall.

14th (S.) H.M.S. "Basilisk" arrived at Plymouth from South-East Coast of America.

15th (M.) Chinese rebels invaded Kow-loon. A British force left Hong-Kong for Kow-loon to restore order.

" " H.M.S. "Psyche" left Plymouth for North America and West Indies.

" " H.M.S. "Archer" arrived at Plymouth from China.

" " H.M.S. "Partridge" left Sheerness for Cape and West Coast of Africa.

16th (T.) Kow-loon and Sam-chun occupied by British troops, and British flag hoisted at Sam-chun.

17th (W.) Russian Minister declines to accept the refusal of the Chinese Government to grant the extension of the Russian Manchurian Railway to Pekin.

18th (Th.) Peace Conference opened at the Hague.

" " H.M.S. "Pomone" left Sheerness for East Indies.

20th (Sat.) A small Punitive Column started against the Shabar-Khel section of the Mia-mai Kabul-Khel Waziris.

,, ,, H.M.S. "Crescent" left Portsmouth for North America and West Indies.

21st (S.) H.M.S. "Tribune" left Sheerness for North America and West Indies.

23rd (T.) Terrible explosion occurred in the Military Laboratory at Refshaleö, Copenhagen. Eight men killed, two injured.

24th (W.) 80th Birthday of Her Majesty the Queen.

25th (Th.) Royal Military Tournament opened by H.R.H. the Duke of York.

,, ,, H.M.S. "Edgar" arrived at Portsmouth with relieved crew of "Royal Sovereign."

26th (F.) H.M.S. "Narcissus" arrived at Portsmouth from China.

30th (T.) Major Marchand arrived at Toulon from Fashoda.

31st (W.) Conference commenced between Sir A. Milner and President Kruger on Transvaal affairs at Bloemfontein.

,, ,, H.M.S. "Archer" paid off at Devonport.

FOREIGN PERIODICALS.

NAVAL.

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NOTICES OF BOOKS.

A History of British India. By Sir WILLIAM WILSON HUNTER. Vol. I. London, New York, and Bombay: Longmans, Green, and Co. 1899.

It is obviously impossible to form a just opinion of the merits of an important historical work after a perusal of no more than the first of seven volumes; no idea of the proportional importance allotted by the writer to the various epochs and events described by him can be formed until the task has been completed; but a very partial estimate can be made of the attractive quality of the history (and history to be read must surely be attractive); and, above all, the writer labours under the great disadvantage of presenting first to his readers the earliest isolated struggles of our countrymen in India and the Eastern Isles, rather than their later triumphant progress when supported by a considerable measure of the naval and military strength of the nation. There is always something depressing in the story of unsupported heroism. We must recognise with pride the dauntless determination of the pioneers of our colonial greatness, yet it is impossible to read of their sufferings, of their cruel deaths, of their frequent abandonment by their kings and statesmen, without bitter feelings of anger and shame that ill-attune the mind to a liking for the history of these great adventurers and their vicissitudes.

As the first volume of Sir William Hunter's "History of British India" carries us no further than the massacre of Amboyna in the year 1623, or thirty-eight years before the marriage of Charles II. with Catherine of Braganza gave us our first foothold in India itself, it must be held as conclusive proof of the historian's power of attracting and holding our interest if we do not complain of his very deliberate fashion of setting about his task.

Yet so it is. Here we have over four hundred pages of condensed narrative, all of matter purely preliminary to the history of British India as generally understood by even the intelligent reader; yet he would be a churl indeed who complained of the fare set before him. We must realise that Sir William Hunter's excuses and motive for so much deliberation is his desire to set before us the true and inward explanation of the growth of the British power in India. It is, he considers, too much our custom to regard this Eastern Empire of ours as an isolated fact in the world's history; whereas we should realise that we have but achieved the ownership of a vast property painfully amassed by other European nations in Asia during the past four centuries.

In this preliminary volume of his history, Sir William tells us then the most interesting and pride-inspiring story of the successive advances Eastward of Portugal, Holland, and England. He relates how Portugal first captured the ocean highways of Asia from the Ottoman Power, held by the latter since the naval destruction of Venice at Lepanto in 1499 and the seizure of Egypt by the Turks seventeen years later. When we English boast ourselves of our complete ownership of the roads to India, Sir William Hunter does well to remind us how Prince Henry the Navigator, Vasco de Gama, and many other sons of Portugal, first found out the way.

This point having been elucidated with great detail, Sir William next approaches the second stage of his narrative, in which the contest between the Protestant Sea-Powers of Northern Europe and the Catholic Sea-Powers of the South is related.

Lastly, Portugal having turned the flank of the Turks and Moors, and Holland and England having out-paced the Portuguese, the first volume ends with the most interesting story of the short-lived rivalry in the East of the Dutch and ourselves.

The study of this rivalry serves to illustrate another of Sir William Hunter's leading doctrines, viz., that no European nation has won the supremacy of the East which did not make it a national concern; and it need hardly be said that this doctrine will receive even stronger support in the subsequent volumes of Sir William's history, which will deal with our rivalry with the French in India.

A few words should be said regarding the remarkable courage and tenacity of purpose shown by Sir William Hunter in the production of the work before us. During twenty-three years of a valuable public service he had collected matter for a complete history of India from the early Aryan period downwards. All this invaluable material was unfortunately lost in the wreck of the "Nepal." It was no ordinary strength of character that enabled Sir William Hunter to recommence his task, though on a less ambitious scale; and it would be a most ungrateful duty to have to speak unfavourably of the result of his determination and industry.

This, however, is far from being the case. It is as yet too early to say whether or no the ideal and final history of British India has been written; but much may be held as certain. We have at least a perfectly clear, though not over-elegant style, great narrative power, the dramatic faculty in no low degree, absolute impartiality, and a very complete knowledge. The first volume of Sir William Hunter's great work is earnestly commended to every student of Indian history.

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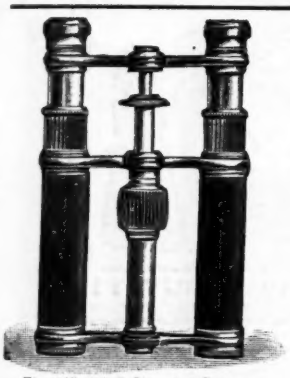

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